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NATIONAL DAM SAFETY PROGRAM. LAKE INEZ DAM (NJ-00228), PASSAIC --ETC(U)
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1 OF 2
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PASSAIC RIVER BASIN
WANAQUE RIVER, PASSAIC COUNTY
NEW JERSEY

LAKE INEZ DAM
NJ 00228

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

DEPARTMENT OF THE ARMY

Philadelphia District
Corps of Engineers
Philadelphia, Pennsylvania

May, 1979

NOTICE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Copies are obtainable from National Technical Information Service, Springfield, Virginia, 22151.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dams	National Dam Inspection Act Report
Visual Inspection	Lake Inez Dam N.J.
Spillway	Structural Analysis
Seepage	

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.

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410 891 SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

JOB

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE—2D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO

NAPEN-D

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, NJ 08621

29 MAY 1979

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Lake Inez Dam in Passaic County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Lake Inez Dam, a high hazard potential structure, is judged to be in poor overall condition. Also, the spillway is considered inadequate since 11 percent of the Probable Maximum Flood (PMF) would overtop the dam. To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be initiated within calendar year 1980. In the interim, a detailed emergency operation plan and warning system, should be promptly developed. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

b. Within six months from the date of approval of this report, engineering studies and analyses should be performed to determine the dam's embankment and foundation condition and structural stability. This should include test borings to determine material properties relative to stability and seepage. Any remedial measures found necessary should be initiated within calendar year 1980. Make a topographic survey of the

dam site and monument the results for use in future inspections.

c. The following remedial actions should be initiated within three months from the date of approval of this report:

(1) The present wooden sluice gate should be replaced by a suitable means of control which can be operated from the dam crest.

(2) The foundation of the mill should be repaired and seepage through the foundation should be sealed off.

(3) The cracks adjacent to the left spillway abutment should be repaired to eliminate the leakage.

(4) Leakage through the penstock and 8-inch diameter pipe could eventually lead to piping through the left end of the dam. Therefore, the intake to these outlets should be properly sealed to stop the leakage.

(5) The notch on the left side of the dam should be filled with concrete to the elevation of the crest of the dam.

(6) The trees adjacent to the sluice gate should be removed and the area restored in order to prevent root damage.

(7) The potential seismicity at the dam site and its effect on the stability of the dam should be investigated.

(8) The dam should be inspected with the reservoir drained down below the spillway.

d. A program of inspections of the dam before and after floods and annually should be initiated by the owners, utilizing the standard visual checklist in this report, so that timely repair actions may be taken as necessary. A permanent record should be kept of all maintenance and operating events of the dam and reservoir.

NAPEN-D
Honorable Brendan T. Byrne

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman Robert A. Roe of the Eighth District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Safety Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,

James G. Ton

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

1 Incl
As stated

Copies furnished:
Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N. J. Dept. of Environmental Protection
P. O. Box CN029
Trenton, NJ 08625

John O'Dowd, Acting Chief
Bureau of Flood Plain Management
Division of Water Resources
N. J. Dept. of Environmental Protection
P. O. Box CN029
Trenton, NJ 08625

LAKE INEZ DAM (NJ00228)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 3 and 20 December 1978 by Jenny-Leedshill Engineers under contract to the State of New Jersey. The State, under agreement with the U. S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

Lake Inez Dam, a high hazard potential structure, is judged to be in poor overall condition. Also, the spillway is considered inadequate since 11 percent of the Probable Maximum Flood (PMF) would overtop the dam. To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be initiated within calendar year 1980. In the interim, a detailed emergency operation plan and warning system, should be promptly developed. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

b. Within six months from the date of approval of this report, engineering studies and analyses should be performed to determine the dam's embankment and foundation condition and structural stability. This should include test borings to determine material properties relative to stability and seepage. Any remedial measures found necessary should be initiated within calendar year 1980. Make a topographic survey of the dam site and monument the results for use in future inspections.

c. The following remedial actions should be initiated within three months from the date of approval of this report:

(1) The present wooden sluice gate should be replaced by a suitable means of control which can be operated from the dam crest.

(2) The foundation of the mill should be repaired and seepage through the foundation should be sealed off.

(3) The cracks adjacent to the left spillway abutment should be repaired to eliminate the leakage.

(4) Leakage through the penstock and 8-inch diameter pipe could eventually lead to piping through the left end of the dam. Therefore, the intake to these outlets should be properly sealed to stop the leakage.

(5) The notch on the left side of the dam should be filled with concrete to the elevation of the crest of the dam.

(6) The trees adjacent to the sluice gate should be removed and the area restored in order to prevent root damage.

(7) The potential seismicity at the dam site and its effect on the stability of the dam should be investigated.

(8) The dam should be inspected with the reservoir drained down below the spillway.

d. A program of inspections of the dam before and after floods and annually should be initiated by the owners, utilizing the standard visual checklist in this report, so that timely repair actions may be taken as necessary. A permanent record should be kept of all maintenance and operating events of the dam and reservoir.

APPROVED: James G. Ton

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

DATE: 29 May 1979

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Lake Inez Federal I.D. No. NJ 00228 New Jersey I.D. No. 23-89
State Located:	New Jersey
County Located:	Passaic
Stream:	Wanaque River
Date of Inspection:	December 3 and 20, 1978

Brief Assessment of General Condition of Dam

The visual inspection indicates that the dam is in generally poor overall condition due to lack of maintenance.

The spillway of Lake Inez Dam is capable of passing approximately 10 percent of the Probable Maximum Flood and is considered inadequate.

The wooden sluice gate is inoperable and leaking badly. The stability of the mill, which forms the right end of the dam, is threatened due to severe erosion of its rubble masonry foundation. There is cracking and leakage at the left abutment of the spillway and water is also leaking through the abandoned penstock and 8-inch diameter pipe. The structural stability of the dam cannot be quantitatively analyzed due to lack of available data.

The following recommendations should be implemented as soon as possible:

1) More sophisticated and detailed hydrologic and hydraulic analyses of the spillway capacity should be performed. From this, a positive action program of corrective measures should be developed and implemented as necessary.

2) Additional effort should be made to obtain information regarding the dam, including design and construction data from the owners.

3) A program of measurements and borings and laboratory tests should be conducted soon to determine the properties of the dam and foundation materials, so that seepage and stability analyses can be performed.

4) The dam should be inspected after the reservoir has been drained down below the spillway.

5) A warning system to alert downstream inhabitants in case of dam failure should be implemented.

6) The seismicity at the dam site and its effect on the stability of the dam should be investigated.

The following actions should be performed in the near future, taking advantage of the above:

1) The present wooden sluice gate should be replaced by a suitable means of control which can be operated from the dam crest.

2) The foundation of the mill should be repaired.

3) The cracks adjacent to the left spillway abutment should be repaired.

4) The intake to the penstock and 8-inch diameter pipe should be completely sealed.

5) A program of inspections of the dam before and after floods and annually should be initiated.

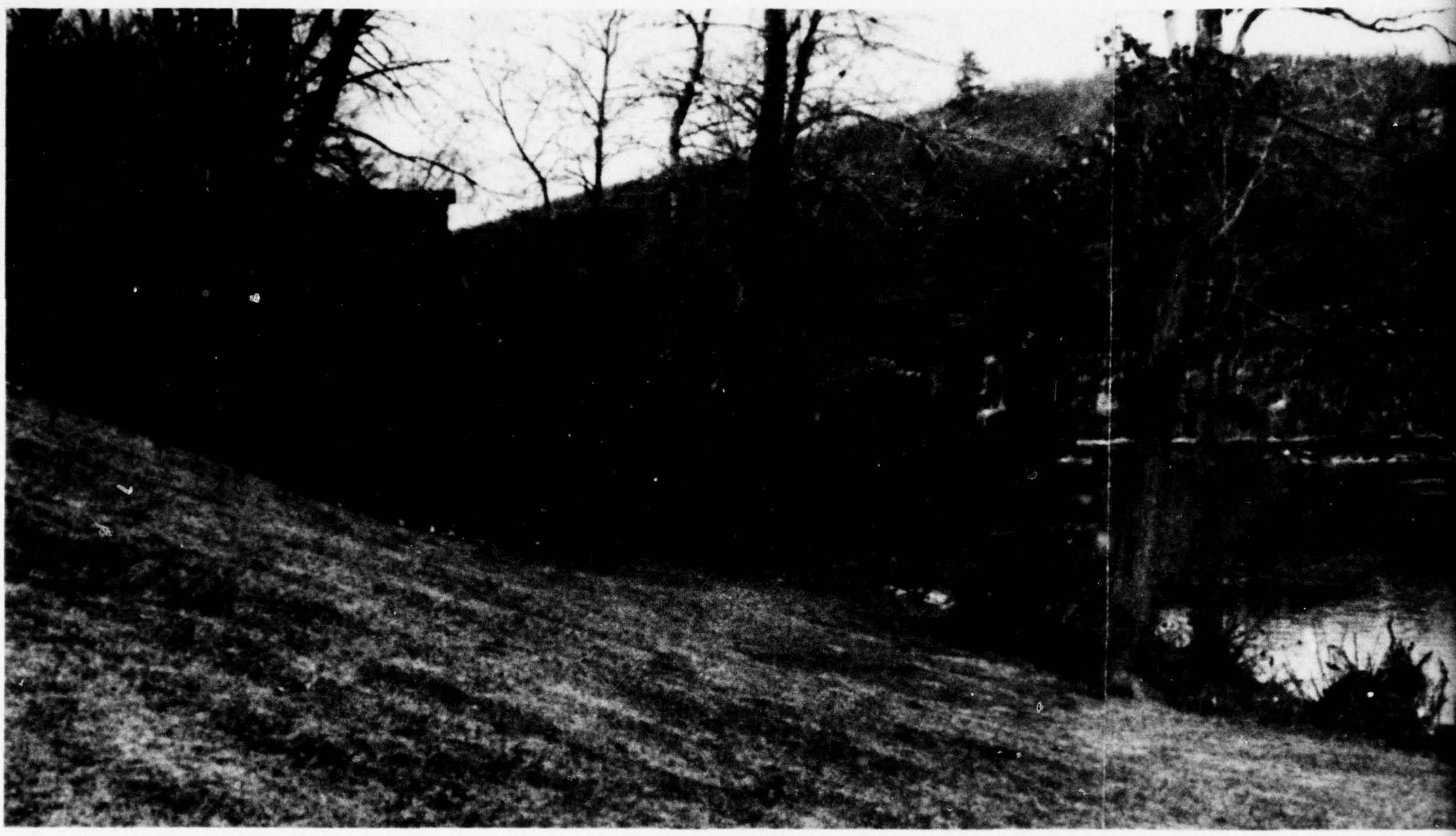
6) The notch on the left side of the dam should be filled with concrete to elevation of the crest of the dam.

7) The trees adjacent to the the sluiceway should be removed.

Frank L. Panuzio

Frank L. Panuzio, P.E.
Project Engineer

Robert J. Jenny, P.E.
Project Director
New Jersey License #9878



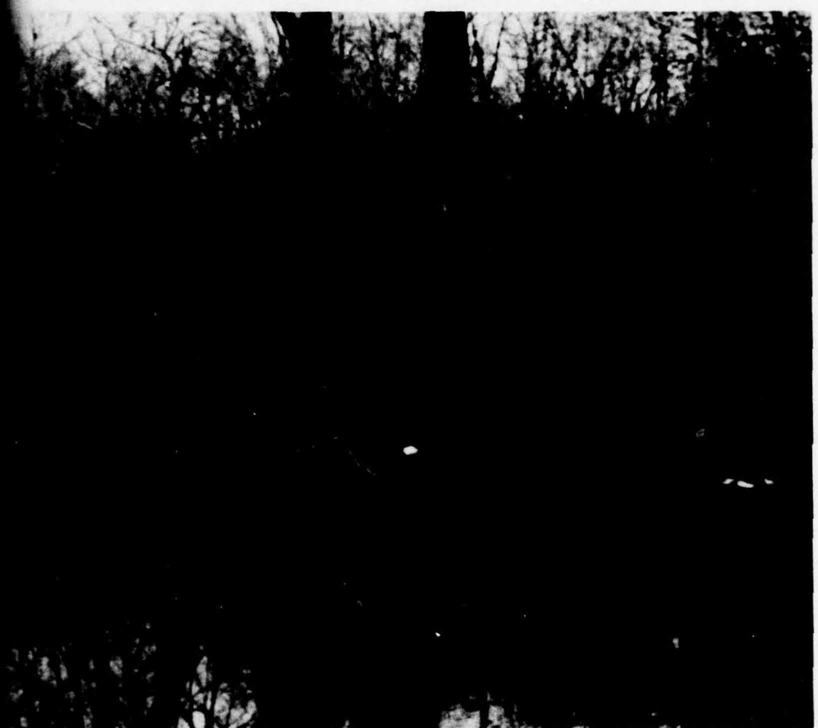
View

1

LAKE INEZ DAM

2

w of dam looking upstream.
(Dec. 3, 1978)



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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D. C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

LAKE INEZ DAM

Federal I.D. No. NJ 00228
New Jersey I.D. No. 23-89

SECTION 1: PROJECT INFORMATION

1.1 General

a. Authority

The National Dam Inspection Act, Public Law 92-367, 1972, provides for the National Inventory and Inspection Program by the U. S. Army Corps of Engineers. This report has been prepared in accordance with this authority, through contract between the State of New Jersey and Jenny-Leedshill Engineers. The State of New Jersey has also entered into an agreement with the U. S. Army Engineer District, Philadelphia, to have this work performed.

b. Purpose of Inspection

The purpose of this inspection was to evaluate the general structural integrity and hydraulic adequacy of the dam, and to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project

a. Description of Dam and Appurtenance

The dam is an ashler masonry structure, the main part of which is a centrally located spillway 206 feet long and approximately 15 feet high. The spillway crest has a 5-foot wide concrete cap, and a concrete apron extends about 15 feet downstream.

The left side of the dam consists of a concrete capped masonry wall which is approximately 65 feet long and 2.6 feet higher than the spillway crest. A masonry wall, the top of which is at the same elevation as the spillway crest, extends 90 feet downstream from the left abutment of the spillway and retains earthfill through which a penstock passes. The end of the now abandoned 5-foot wide oval penstock extends through a masonry wall as shown on Plate 2.

The section of the dam adjacent to the right spillway abutment consists of a masonry wall which extends approximately 5 feet above the crest of the spillway. The configuration of this section of the dam, which also forms the right spillway training wall, is shown on Plate 2. The right side of the dam is formed by the foundation of a now abandoned mill building.

A 9.4-foot wide sluiceway with a slide gate consisting of wooden 4-inch by 8-inch wooden planks is located to the left of the abandoned mill building.

b. Location

Lake Inez Dam is located in north central New Jersey on the Wanague River in the Borough of Pompton Lakes, Passaic County. The regional vicinity plan is presented on Plate 1.

c. Size Classification

The storage capacity of Lake Inez is 470 acre-feet when the reservoir surface is at the top of dam. The dam is 17.6 feet high; therefore, the size classification of the dam is Small.

The criteria for size classification of dams are set forth in the Corps' Guidelines. A small size dam is one in which the reservoir capacity is greater than or equal to 50 acre-feet and less than 1000 acre-feet, and/or the maximum height is greater than or equal to 25 feet and less than 40 feet.

d. Hazard Classification

The dam is located in the Borough of Pompton Lakes

(population 11,500). A road and railroad bridge and at least 30 structures are located within the flood path downstream of the dam. Failure or misoperation of the dam could result in the loss of more than a few lives and excessive economic loss; therefore, the dam merits a High Hazard classification.

e. Owner

The dam is owned by Artistic Identifications Systems, Inc., Pompton Lakes, New Jersey.

f. Purpose of Dam

The dam was originally built to provide power to the owner's weaving factory adjacent to the dam. It is now used only for recreation.

g. Design and Construction History

There is no available information regarding the design of the dam. Drawings of the dam were reportedly destroyed in a fire.

The dam was reportedly built by Julius Smith, and a plaque on the dam adjacent to the mill building indicates that the dam was built in 1889. Discussions with a local resident indicated that the dam was destroyed by a flood in 1903; however, no information is available to confirm this, and the extent of damage is unknown.

h. Normal Operational Procedures

There is no known regulation of the dam or reservoir. The visual inspection indicates that the reservoir is designed to be emptied via the sluice at the right abutment; however, it appears that the gate is presently inoperable.

1.3 Pertinent Data

a. Drainage Areas (sq. Mi.) 98.1

b. Discharge at Damsite (cfs)

Ungated spillway capacity at maximum pool elevation 2,805

c. Elevation (ft. above MSL)

• Top Dam	198.6
• Spillway crest	196
• Streambed at centerline of dam	181

d. Reservoir Length (ft.)

• Maximum pool (top of dam)	7300
• Recreation pool (Spillway crest)	7200

e. Storage (acre-feet)

• Top of dam	470
• Spillway crest	300

f. Reservoir Surface (acres)

• Top dam	60
• Spillway crest	51

g. Dam

• Type	Ashlar masonry dam
• Length	345 ft. (approx.)
• Height	17.6 ft.
• Top Width	5 feet
• Side Slopes	Unknown
• Zoning	Unknown
• Impervious Core	Unknown
• Cutoff	Unknown
• Grout curtain	Unknown

h. Spillway

• Type	Masonry Dam
• Length of weir	205.9 ft.
• Crest elevation	196 ft.
• U/S Channel	Reservoir
• D/S Channel	Concrete apron

i. Regulating Outlets

- a) 5 ft. wide steel oval penstock at left abutment
- b) 9.4 ft. wide sluice with 4 in. x 8 in. wooden plank gate

SECTION 2: ENGINEERING DATA

2.1 Design

a. Geologic Conditions

Lake Inez Dam is located in north-central New Jersey very close to the eastern border of the Highlands physiographic province. The regional geology of the Highlands is discussed in Appendix C to this report.

The dam and its reservior are situated in a long, narrow gorge which appears to be controlled by the underlying geologic structure. The linear, of which the gorge is a part, can be traced for more than 10 miles. A fault approximately one-quarter mile east of the left abutment is shown on New Jersey Geology Department maps, but no fault is shown in the valley bottom. However, a fault has been inferred by others upstream of the dam.

Bedrock is exposed on the left abutment of the dam. The rock appears to be primarily a pink tinted, white and black gneiss with distinct gneissic banding and a high percentage of quartz. A hard, finely crystalline, dark mafic rock is exposed within the gneissic mass which may be a dike, but vegetation and thin soil cover make the surficial tracing of the dike impractical. The bedrock extends all the way to the toe of the left abutment and it would appear that this abutment was constructed directly on the rock.

No bedrock exposures were observed under the dam or on the right abutment which has been completely altered by the construction of roadways and a large factory. Behind the factory, approximately 300 yards from the

abutment, bedrock is exposed, similar to that seen on the left abutment. There are no indications of whether the major part of the dam is built on bedrock or overburden.

Soil in the area appears to be primarily glacial till with recent alluvium in the bottom of the stream and in the flood plain.

The dam is located less than one-half mile from the long, continuous Ramapo Fault which divides the New Jersey Highlands from the Piedmont Lowlands. Several small earthquakes have occurred recently along this fault and it is currently under study as an "active" fault by Columbia University's Lamont-Doherty Geophysical Laboratory.

b. Design Data

There are no available data regarding the design of the dam. Drawings of the dam were reportedly destroyed in a fire.

2.2 Construction

The dam was reportedly built by Julius Smith and a plaque on the dam adjacent to the mill building indicates that the dam was built in 1889. Discussions with a local resident indicate that the dam was destroyed by a flood in 1903; however, no information is available to confirm this and the extent of damage is unknown.

A raceway through the base of the mill at the right abutment has been sealed with concrete blocks. The penstock at the left abutment has been abandoned and the power plant removed.

2.3 Operations

There is no known regulation of the dam or reservoir.

The visual inspection indicates that the reservoir is designed to be emptied via a sluicegate adjacent to the mill; however, the gate lift mechanism is presently broken.

2.4 Evaluation

a. Availability

No data regarding the design, construction or operation of the dam were made available by the owners of the dam. Available data consist of an inspection report prepared by the State in 1960 and "Dams in New Jersey - Reference Data" dated September 14, 1965. These data are included in Appendix D.

b. Adequacy

The structural stability of the dam cannot be evaluated due to the complete absence of any design and construction data.

c. Validity

The observations made during the 1960 inspection were generally confirmed by the present inspection.

Limited information regarding the history of the dam were obtained from a local resident; however, this information could not be substantiated.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General

Visual inspections of Lake Inez Dam were made on December 3 and 20, 1978. The level of the reservoir was approximately 2 inches above the crest of the spillway during the December 3, 1978 inspection.

Visual inspection indicates that the dam is in need of remedial work to assure continued structural integrity. The wooden sluice gate is inoperable and leaking badly. The stability of the mill, which forms the right side of the dam, is threatened due to severe erosion of its rubble masonry foundation.

Detailed inspection was made of the dam, appurtenant structures, reservoir and downstream channel. Descriptions of the findings of those inspections are summarized in the paragraphs which follow. The check list of visual inspection items is included in Appendix A. Geologic and foundation conditions observed at the time of inspection are noted in greater detail in Section 2.

b. Dam

The dam was inspected for signs of settlement, seepage, erosion, cracking and any other evidence of undesirable behavior which might affect the stability of the structure.

The wall forming the left side of the dam bends upstream but it appears that this alignment has existed for some time and no signs of recent movement were detected.

The left side of the dam is founded on rock and a deposit of soil has formed a beach on the upstream side at the left abutment. (Photo 1)

Severe cracking and separation between the concrete cap and masonry were observed at the junction of the left side of the spillway and the dam (Photo 2). Water from the reservoir is leaking through these cracks at an estimated rate of 5 gpm, forming a pond 6 to 12 inches deep. (Plate 2). There is a notch in the left side of the dam approximately 2 feet deep and 6 feet long which may have been associated with the penstock which appears to pass beneath the dam at this location.

Some minor seepage was noted through the masonry retaining wall which extends downstream from the left spillway abutment but it otherwise appears to be in good condition.

The section of the dam to the right of the spillway appears to be in generally good condition with the exception of some small trees that are growing next to, and in some places in, the masonry structure.

At the right abutment, the foundation of a mill building acts as part of the dam (Photo 3). A raceway which originally passed through the mill has been sealed with concrete bricks. The rubble masonry foundation of this building on the downstream side has been severely eroded (Photo 4). The erosion is most severe on the east side adjacent to the sluiceway and particularly at the downstream corner of the building. A minor amount of seepage through the foundation of this building was also observed.

c. Appurtenant Structures

Spillway

The spillway occupies the central section of the dam and turns at an angle approximately 30 feet from the right abutment. (Photo 6)

The ashlar masonry spillway structure has a concrete cap approximately 5 feet wide. This cap is generally set upstream of the masonry face except along a section approximately 25 feet long adjacent to the left abutment. This offset in the position of the spillway crest is shown in Photo 6 and is made most obvious by the different characteristics of flow over the spillway. Water flowing over the spillway obscured this structure so that the offset in the spillway crest and the face of the spillway could not be closely observed.

A concrete apron extends 10 to 15 feet downstream from the dam. (Photos 5 through 7) The foundation of the spillway and apron were submerged and therefore could not be observed.

Five loose stones, similar to those that comprise the downstream face of the spillway structure, are lying on the spillway apron (Photo 7). However, due to the flow of water over the spillway, it could not be determined if these stones were dislodged from the spillway.

Outlet Works

An abandoned 5-foot wide steel, oval penstock and an 8-inch diameter steel pipe were observed on the downstream side of the left abutment of the dam (Plate 2 and Photo 8). Water was leaking through both these outlets at a rate of about 10 gpm. There is presently no indication of a power plant or other similar structure in the vicinity

of the penstock.

A 9.4-foot wide sluice gate consisting of 4-inch by 8-inch boards is located to the left of the mill at the right side of the dam. The gate controls are inoperable and there is serious leakage between the boards (Photo 9). A small tree growing in the masonry wall adjacent to the sluice is shown in Photo 9. The discharge from the sluice flows adjacent to the old mill and joins the main channel downstream as shown in Plate 2.

A raceway through the mill has been sealed off as discussed above.

d. Reservoir Area

The reservoir is relatively narrow, and trends north-south. The slopes are generally gentle to moderately steep, and heavily wooded. The owner's factory buildings occupy the right bank immediately upstream from the dam (Photo 10).

There was a minor amount of debris in the reservoir and at the spillway crest. There was no indication that sedimentation is excessive.

d. Downstream Channel

The slopes of the channel directly downstream from the dam are moderately steep and covered with grass and some trees (Photo 11).

A steel road bridge in the Borough of Pompton Lakes is located approximately 500 feet downstream from the dam (Photos 11 and 12).

SECTION 4: OPERATIONAL PROCEDURES

4.1 Procedures

There is no known regulation of the reservoir, since all outlets either have been abandoned or are inoperable. The former raceway through the mill has been sealed off and the penstock at the left abutment has been abandoned. Controls for the timber sluice gate adjacent to the mill are broken and inoperable.

4.2 Maintenance of Dam

There are no records available regarding maintenance of the dam, and, based on the visual inspection, little, if any, maintenance work has been done in recent years. There are no instrumentation or monitoring systems on the dam or reservoir.

4.3 Maintenance of Operating Facilities

No maintenace records of operating facilities are available. The timber sluice gate is leaking and the controls are broken.

4.4 Description of Warning Systems

There is no warning system or emergency contingency plan in event of flooding or possible failure of the dam.

4.5 Evaluation of Operational Adequacy

The present operation and maintenance of the dam is deficient. It appears that there has been little maintenance

of the dam. The disrepair of the sluice gate is a serious operational deficiency since this gate is now the only reservoir outlet.

A warning system is needed to alert downstream inhabitants in time of floods and possible overtopping or failure of the dam.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data

As already stated, in Section 1.2, Lake Inez Dam is classified as high hazard and small in size. In accordance with the Corps of Engineers', "Recommended Guidelines for Safety Inspection of Dams," the Spillway Design Flood (SDF) should be 50% to 100% of the Probable Maximum Flood (PMF). The 100% PMF was selected as the SDF because of the high hazard to loss of life immediately downstream of the dam.

Data obtained from the Corps indicates the drainage basin area of Lake Inez Dam is 98.1 square miles. This drainage basin was divided into three sub-basins: one above Skyline Dam No. 1 having a drainage area of 2.9 square miles; another above Raymond Dam, which impounds Wanaque Reservoir, having a drainage area of 90.4 square miles; and the third sub-basin between Wanaque Reservoir, Skyline Lake No. 1 and Lake Inez having a drainage area of 4.8 square miles. The drainage sub-basins are delineated on a U.S.G.S. topographic map and presented on Plate D-1, Appendix D.

The hydraulic and hydrologic features of Lake Inez Dam were evaluated using criteria set forth in the Corps of Engineers' "Recommended Guidelines for Safety Inspection of Dams", and additional guidance and criteria provided by the Philadelphia District, Corps of Engineers. The PMF outflow hydrograph from the Wanaque Reservoir sub-basin was supplied by the Corps and used in the analyses. The PMF outflow hydrograph from Skyline Lake No. 1 was

previously calculated by Jenny-Leedshill and, as requested by the Corps, was used in this analysis. The Probable Maximum Precipitation (PMP) for the sub-basin between Wanaque Reservoir, Skyline Lake No. 1 and Lake Inez was calculated using Hydrometeorological Report No. 33 and the Hop Brook reduction factor for misalignment for the storm. The PMF for this sub-basin was calculated using the Corps' computer program HEC-1, Dam Break Version (HEC-1,DB). The Corps requested that the Snyder Unit Hydrograph with C_t and C_p coefficients of 2.0 hours and 0.63 hours, respectively, be used to calculate the PMF.

In computing the PMF for the sub-basin between Wanaque Lake, Skyline Lake No. 1 and Lake Inez, an initial infiltration loss of 0.5 inch and a final infiltration loss rate of 0.05 inch per hour were used in the HEC-1,DB program to give excess rainfall. Using the excess rainfall and the unit hydrograph, the program computed the peak inflow discharges from the sub-basin of the 10 percent, 25 percent, 50 percent and 100 percent PMF. These discharges are approximately, 1,210 cfs, 3,040 cfs, 6,070 cfs and 12,140 cfs, respectively.

As previously stated, the PMF outflow hydrograph from Wanaque Reservoir was supplied by the Corps. The PMF peak outflow from Wanaque Reservoir is 28,300 cfs. The PMF outflow hydrograph from Skyline Lake No. 1, as previously calculated by Jenny-Leedshill, is 10,600 cfs. This peak outflow was calculated assuming both Skyline Lake Dam No. 1 and the upstream Skyline Lake Dam No. 2 breach due to overtopping. The PMF outflow hydrographs from Wanque Reservoir and Skyline Lake No. 1 were multiplied by 0.1, 0.25, and 0.5 to provide estimates of the 10 percent, 25 percent and 50 percent PMF.

The various percentages of the PMF hydrograph from Skyline Lake No. 1 were routed downstream through three successive reaches to the Wanaque River. These floods were then combined with the corresponding percentage PMF outflows from Wanaque Reservoir. The combined hydrographs were then routed downstream to Lake Inez and combined with the runoff from the intermediate basin. The peak inflow discharges into Lake Inez for the 10 percent, 25 percent, 50 percent, and 100 percent PMF were calculated to be approximately 2,930 cfs, 7,420 cfs, 15,000 cfs and 30,000 cfs, respectively.

The various percentages of the PMF inflow hydrograph were routed through Lake Inez using the Modified Puls Method by the HEC-1,DB program. The peak outflow discharges of the 10 percent, 25 percent, 50 percent and 100 percent PMF were calculated to be approximately 2,880 cfs, 7,280 cfs, 14,510 cfs and 28,710 cfs, respectively. The flood routings indicate that all floods greater than about 10 percent of the PMF will overtop the dam. A plot of percent PMF versus peak outflow discharge is presented as Plate D-2 in Appendix D.

The spillway and overtop stage-discharge rating curve used in the flood routings through Lake Inez was calculated using the weir equation. Tailwater effects, caused by a constriction in the downstream channel, were considered in developing the rating curve. The spillway and dam crest is a 5-foot wide weir with an estimated discharge coefficient of 3.1. The reservoir stage-storage curve was determined from U.S.G.S. 7.5 - minute topographic maps and data obtained from State files. This stage-storage curve was extended above the dam crest to include surcharge storage

during peak flood discharges. In the reservoir routing computations possible discharges through the outlet works were excluded because their capacity is small compared to the PMF and because of the possibility that they may be closed or inoperable. The stage-storage and the spillway and overtop stage-discharge curves are presented in Appendix D as Plates D-3 and D-4, respectively.

The various percentage PMF outflow hydrographs from Lake Inez were routed 0.5 miles downstream through two successive reaches through the Borough of Pompton Lakes. These routings were made to determine downstream flooding characteristics. These characteristics are presented in the following tabulation. The hydraulic parameters used in the HEC-1,DB program for the downstream routing calculations were estimated based on observations made in the field and information obtained from U.S.G.S. topographic maps.

FLOODING CHARACTERISTICS AT THE BOROUGH OF POMPTON LAKES

	10% PMF	25% PMF	50% PMF	100% PMF
Peak Discharge, cfs.	2,890	7,270	14,510	28,770
Maximum Stage, ft.	190.6	195.2	199.5	204.3

In the Borough of Pompton Lakes there appears to be at least 30 structures below elevation 200 feet. During large floods several of these structures could sustain severe damage and loss of life could result.

There were three outlet structures at Lake Inez. Two of the outlets have been abandoned. The third outlet is a small sluiceway with a timber gate. The gate is in very poor condition but could be removed if lake drawdown were required. A rating curve for the sluiceway, assuming the gate is removed, was estimated using the weir equation.

Using this rating curve and assuming no inflow into the lake and no tailwater effects, the time required to drain the reservoir from a spillway full condition was calculated to be about 13 hours.

b. Experience Data

Records of lake levels are not maintained for this site. The dam which originally was built to supply water and power to an old adjacent mill, is now used for recreational purposes.

c. Visual Observations

There is a well defined channel downstream of the dam. There are structures on both banks. There is a bridge approximately 500 feet downstream of the dam. The banks downstream are tree lined with little undergrowth. The overbank slopes are gentle, and include open areas, wooded areas, and residential and commercial areas.

d. Overtopping Potential

As indicated in Section 5.1-a, the Lake Inez Dam spillway can pass only 10 percent of the PMF. During the PMF the dam would be overtopped 11.8 feet.

During large floods the water surface elevation downstream of the spillway is only slightly less than the upstream elevation because of a constriction in the downstream channel. The tailwater effect limits the flood's capacity to erode a breach in the embankment and limits the static forces on the masonry portion of the dam. There is some question as to whether these forces would be adequate to cause a dam breach. In addition, the channel constriction limits the downstream discharge such that a dam breach would increase the downstream discharge only a small amount. Thus, the spillway for Lake Inez Dam should be classified as inadequate.

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

Visual inspection indicates that the dam is in need of remedial work to assure continued structural integrity. The wooden sluice gate is inoperable and leaking badly. The stability of the mill, which forms the right side of the dam, is threatened due to severe erosion of its rubble masonry foundation, although the upstream face of the foundation is newer and in better condition. Some cracking and leakage was observed at the left abutment of the spillway and water is also leaking through the abandoned penstock and 8-inch diameter pipe.

Water flowing over the spillway obscured inspection of this structure. Several large masonry stones are lying on the concrete apron; however, it could not be determined if these stones have been dislodged from the spillway. In addition, the condition of the spillway foundation could not be inspected.

b. Design and Construction Data

There are no available data regarding the design and construction of the dam or outlet works; therefore, the structural stability of the dam cannot be evaluated. Nothing is known of the core of the dam, the foundation, or the cross sectional configuration.

c. Operating Records

The reservoir is uncontrolled and there is no

instrumentation of the dam. Records of reservoir levels and water withdrawals are not available. A brief inspection report was made by the State in 1960 and is included in Appendix D, page D-41.

d. Post-Construction Changes

The original dam was reportedly destroyed by a flood in 1903; however, there is no documentation to confirm this nor descriptions of re-construction.

A raceway through the foundation of the mill building has been sealed off with concrete blocks. The penstock at the left abutment has been abandoned and the power generating equipment removed.

e. Seismic Stability

The dam is located in Seismic Zone 1, in which it may generally be assumed that there is no hazard from earthquakes, provided static stability conditions are satisfactory and conventional safety margins exist. However, as pointed out in Section 2.1-a, the dam is located less than one-half mile from the seismically active Ramapo Fault. In addition, the reservoir is situated in what is thought to be a structurally controlled valley and a fault has been inferred by others upstream from the reservoir. Data are insufficient at this time to assess seismic stability, should a significant earthquake occur in the vicinity of the dam.

SECTION 7: ASSESSMENT, RECOMMENDATIONS, PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment

a. Safety

The spillway of Lake Inez Dam can pass only about 10% of the probable Maximum Flood and is considered inadequate.

The structural stability of the dam cannot be quantitatively analyzed due to lack of available data. The visual inspection indicates that the dam is in generally poor condition and has not been well maintained. The wooden sluice gate is leaking badly and the lift mechanism is broken. The foundation of the mill building at the right side of the dam is badly deteriorated, except on the upstream side, and its failure could cause failure of the upstream side which acts as part of the dam. There is some leakage at the left abutment of the spillway, and water is also leaking through the abandoned penstock and 8-inch diameter pipe.

b. Adequacy of Information

The information and data obtained are not adequate to perform a comprehensive evaluation of the dam's structural stability because of an absence of data regarding the design and construction of the dam and as-built conditions.

c. Urgency

The visual inspection revealed deficiencies which

are detrimental to the integrity of the structure. Therefore, it is recommended that the owners perform the remedial measures discussed below as soon as possible. The most urgent items are the repair of the sluice gate and foundation of the mill.

d. Necessity for Additional Data/Evaluation

The main section of the dam was obscured by water overflow and could not be closely observed. Therefore, the dam should be inspected with the reservoir level far below the spillway crest.

The Corps of Engineers Guidelines require that, in general, seepage and stability analyses should be on record for all dams in the high hazard category. At the present time there are inadequate data to perform these analyses. Since none exist, every effort should be made as soon as possible to obtain data regarding the dam including design and construction information, from the owners. At the same time, because so little is known about the as-built condition of the dam and appurtenant structures, and because of the high hazard downstream, a timely program of measurements and borings and laboratory tests of the dam and foundation should be undertaken soon so that seepage and stability analyses can be performed and the safety of the dam evaluated.

The hydrologic analysis indicates that the spillway is inadequate. Therefore, more sophisticated and detailed hydrologic and hydraulic analyses of the spillway capacity should be performed as soon as possible. From this, a positive action program of corrective measures should be developed and implemented as necessary.

Although the dam is located in Seismic Zone 1, it is situated in a valley which was possiblv formed as the result of faulting and is in close proximity to the seismically active Ramapo Fault. Therefore, the potential seismicity at the dam site and its effect on the stability of the dam should be investigated.

7.2 Remedial Measures

a. Repair Procedures

It is recommended that the following remedial measures be performed as soon as possible.

1) The present wooden sluice gate should be replaced by a suitable means of control which can be operated from the dam crest.

2) The foundation of the mill should be repaired and seepage through the foundation should be sealed off.

3) The cracks adjacent to the left spillway abutment should be repaired to eliminate the leakage.

4) Leakage through the penstock and 8-inch diameter pipe could eventually lead to piping through the left end of the dam. Therefore, the intake to these outlets should be properly sealed to stop the leakage.

5) The notch on the left side of the dam should be filled with concrete to the elevation of the crest of the dam.

b. Operation and Maintenance Procedures

A program of inspections of the dam before and after floods and annually should be initiated by the owners, utilizing the standard visual checklist in this report, so that timely repair actions may be taken as necessary.

A permanent record should be kept of all maintenance and operating events of the dam and reservoir.

The trees adjacent to the sluice gate should be removed soon and the area restored in order to prevent root damage.

A warning system should be established whereby downstream inhabitants can be notified and evacuated in the event of possible dam failure.

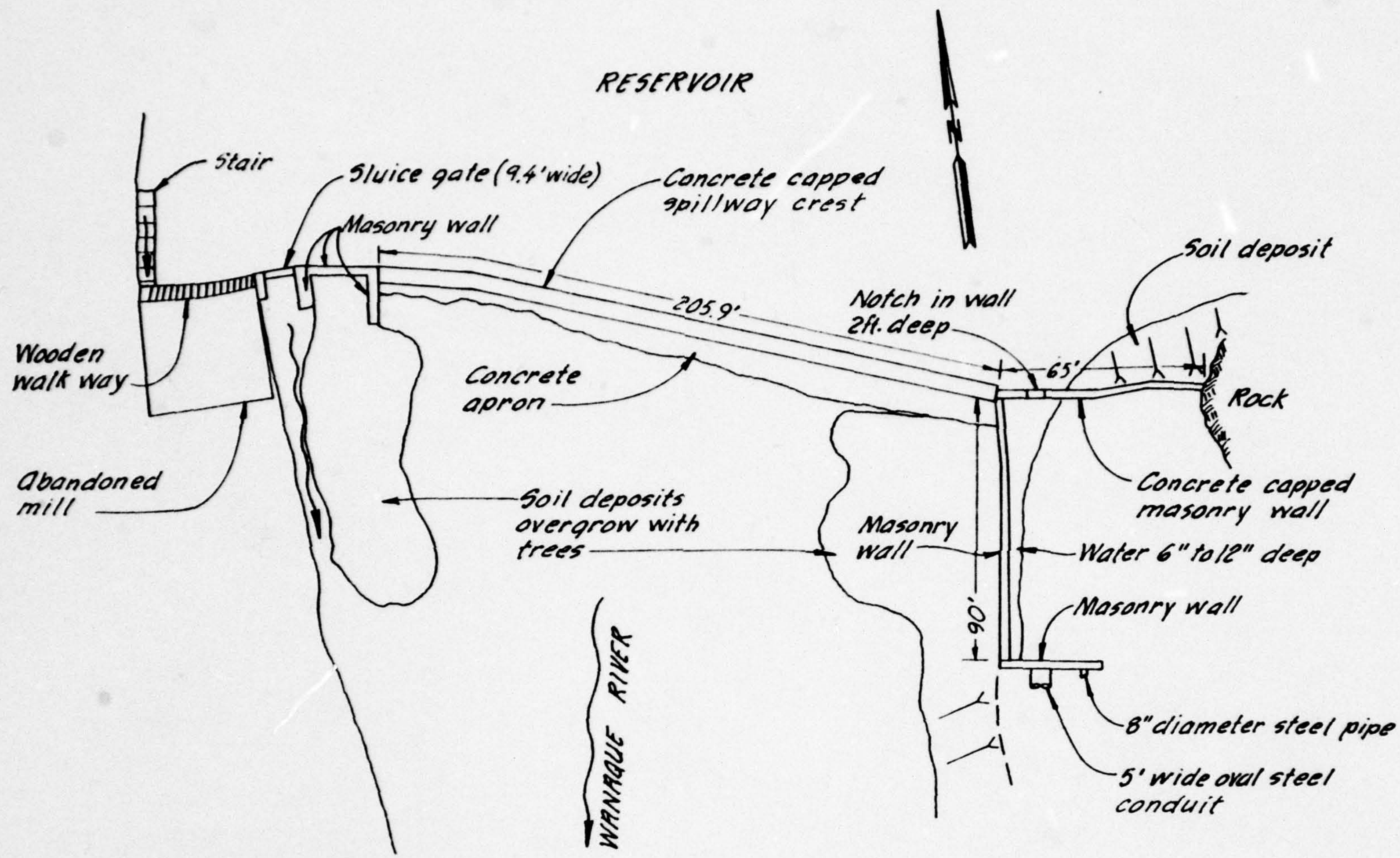
1000 0 1000 2000 3000 4000 5000 6000

SCALE IN FEET

AREA LOCATION

VICINITY MAP

JENNY-LEEDSHILL FEBRUARY 1979



Not to scale

LAKE INEZ DAM

GENERALIZED PLAN BASED ON VISUAL INSPECTION, DECEMBER 3, 1978

JENNY-LEEDSHILL JANUARY 1979

PLATE 2

APPENDIX A

CHECK LIST - VISUAL OBSERVATIONS

CHECK LIST - ENGINEERING, CONSTRUCTION MAINTENANCE DATA

Check List
Visual Inspection
Phase 1

Name Dam Lake Inez **County** Passaic **State** New Jersey **Coordinators** NJDEP

Coordinates: Lat. 41° 00' 30"
Long. 74° 17' 30"

Date(s) Inspection Dec. 3 & 20, 1978 **Weather** Overcast **Temperature** 36°

Pool Elevation at Time of Inspection 196 M.S.L. (approx.) **Tailwater at Time of Inspection** 182 M.S.L. (approx.)

Inspection Personnel:

(Dec. 3, 1978)	(Dec. 20, 1978)	
R. C. Gaffin	R. J. Jenny	
A. R. Slaughter	D. J. Lachel	
	F. L. Panuzio	
P. L. Wagner	A. R. Slaughter	

Robert C. Gaffin **Recorder**

CONCRETE/MASONRY DAMS

Lake Inez Dam

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SEEPAGE OR LEAKAGE	-Water was leaking through the left abutment of the spillway at a rate of about 5 gpm -The face of the dam could not be inspected for seepage or leakage due to water passing over the dam.	-Minor seepage through foundation of mill building at right abutment and left wing walls. Left abutment of spillway should be sealed to prevent leaking.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	-Left abutment is founded on rock -Old mill building at right abutment. Previous raceway through mill has been walled off with concrete blocks.	
DRAINS	None observed	
WATER PASSAGES	-See 'Outlet Works'	
FOUNDATION	-Rock outcropping at left abutment -Rubble masonry foundation at mill building was significantly eroded	Foundation of abandoned mill at right abutment should be repaired

CONCRETE/MASONRY DAMS

Lake Inez Dam

VISUAL EXAMINATION OF	OBERSVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	- Several surface cracks noted in concrete cap of masonry walls at left and right abutments - Some mortar is missing from masonry wall adjacent to sluiceway at right abutment	
STRUCTURAL CRACKING	- Concrete on left wall adjacent to spillway is in poor condition and separating from masonry.	
VERTICAL AND HORIZONTAL ALIGNMENT	a) Wall at left abutment bowed upstream b) Crest of overflow section is set back from masonry face of dam except ± 25 ft. section at left where the cap extends further D/S than masonry face	
MONOLITH JOINTS	None observed	
CONSTRUCTION JOINTS	None observed	

EMBANKMENT
(None)

Lake Inez Dam

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	Not applicable	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	Not applicable	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Not applicable	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	Not applicable	
RIPRAP FAILURES	Not applicable	

EMBANKMENT
(None)

Lake Inez Dam

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
VEGETATION	Not applicable	
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Not applicable	
ANY NOTICEABLE SEEPAGE	Not applicable	
STAFF GAGE AND RECORDER	Not applicable	
DRAINS	Not applicable	

OUTLET WORKS

Lake Inez Dam

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Not applicable	
INTAKE STRUCTURE	Intake to the raceway through base of abandoned mill has been sealed with concrete blocks	
OUTLET STRUCTURE	a) Mechanically operated wooden sluice gate 9.4' wide located to the left of the mill building. Water is leaking between 4" x 8" wooden boards. Small tree is growing from masonry wall to the left of gate. b) Abandoned 5 ft. wide steel oval penstock and 8 in. diameter steel pipe at downstream end of left wing wall, leaking at a rate of approx. 10 gpm.	a) Sluice gate should be replaced and tree should be removed b) Intake to penstock and 8" pipe should be sealed
OUTLET CHANNEL	Unlined channel downstream of sluice gate passes along the foundation of the abandoned mill and enters the main downstream channel. Water was about 1 ft. deep during inspection. Boulder blocking channel 15 ft. D/S from gate	
EMERGENCY GATE	See above	

UNGATED SPILLWAY

Lake Inez Dam

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	- Concrete cap approximately 5 ft. wide. Cap is generally upstream of masonry face of dam except the $\pm$ 25 ft. at left where the crest extends further D/S than face. - Few eroded notches in crest	
APPROACH CHANNEL	Reservoir	
DISCHARGE CHANNEL	- Concrete apron extends 10' to 15' downstream - 5 large masonry stones, similar to those in dam, are on apron - Minor debris at base of spillway	Stones on spillway apron may have been dislodged from dam.
BRIDGE AND PIERS	None	

GATED SPILLWAY
(None)

Lake Inez Dam

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Not applicable	
APPROACH CHANNEL	Not applicable	
DISCHARGE CHANNEL	Not applicable	
BRIDGE AND PIERS	Not applicable	
GATES AND OPERATION EQUIPMENT	Not applicable	

INSTRUMENTATION
(None)

Lake Inez Dam

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	None	

RESERVOIR

Lake Inez Dam

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Slopes are generally gentle to moderately steep and wooded. Industrial development on right bank.	
SEDIMENTATION	Sedimentation does not appear to be excessive. Minor debris at spillway crest.	

DOWNSTREAM CHANNEL

Lake Inez Dam

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Steel road bridge approximately 500 ft. D/S and Borough of Pompton Lakes. Rail-road bridge about 1,000 ft. D/S from road bridge Minor debris	
SLOPES	Moderately steep slopes with grass and moderate growth of trees	
APPROXIMATE NO. OF HOMES AND POPULATION	Numerous homes, businesses and roads in Pompton Lakes at elevations below the crest of the dam.	

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Lake Inez Dam

ITEM	REMARKS
PLAN OF DAM	None
REGIONAL VICINITY MAP	Dam and reservoir are shown on U.S.G.S. Wanaque Quadrangle, scale 1:24,000
CONSTRUCTION HISTORY	Plaque on dam gives construction date of 1889.
TYPICAL SECTIONS OF DAM	None
HYDROLOGIC/HYDRAULIC DATA	None
OUTLETS - PLAN	None
- DETAILS	None
-CONSTRAINTS	None
-DISCHARGE RATINGS	None
RAINFALL/RESERVOIR RECORDS	None

Sheet 2

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Lake Inez Dam

ITEM	REMARKS
DESIGN REPORTS	None
GEOLOGY REPORTS	None
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None
POST-CONSTRUCTION SURVEYS OF DAM	None
BORROW SOURCES	Unknown

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Lake Inez Dam

ITEM	REMARKS
SPILLWAY-PLAN	None
-SECTIONS	None
-DETAILS	None
OPERATING EQUIPMENT PLANS & DETAILS	None
MONITORING SYSTEMS	None
MODIFICATIONS	Raceway through mill at right abutment has been sealed off and penstock at left abutment has been abandoned.
HIGH POOL RECORDS	None
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	a) "Report on Dam Inspection", by Michael J. Galley, June 2, 1960 b) "Dams in New Jersey - Reference Data," dated Sept. 14, 1965
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	Verbal report indicates dam was destroyed by flooding in 1903.

Sheet 4

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Lake Inez Dam

ITEM	REMARKS
MAINTENANCE OPERATION RECORDS	None

APPENDIX B

PHOTOGRAPHS

(Note: All photographs were taken on Dec. 3, 1978)

Photo 1
View of left abutment of dam looking west

Photo 2
View of left spillway abutment looking west

Photo 3
View of mill at right
abutment of dam looking east

Photo 4
View of mill foundation
looking west with sluiceway in foreground

Photo 5
View along spillway crest
looking towards left abutment

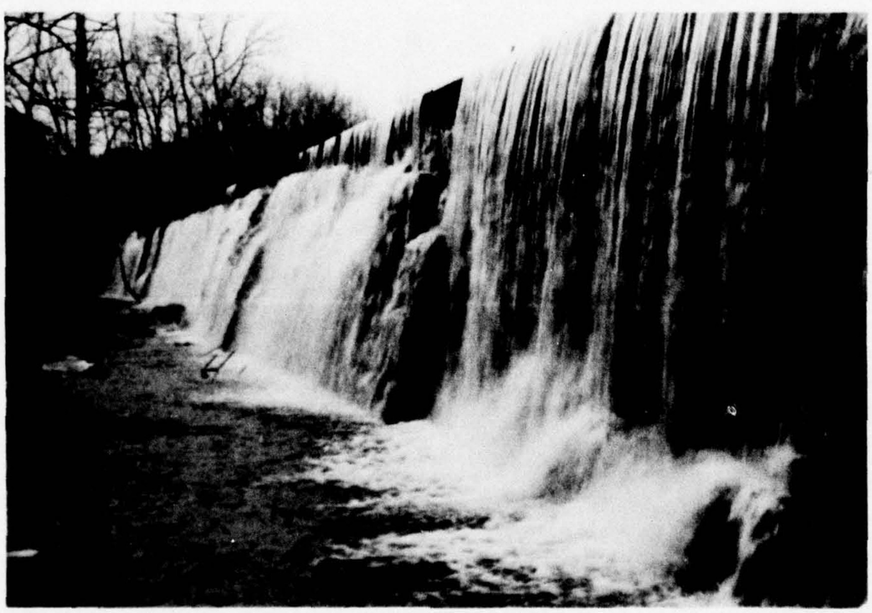


Photo 6
View of spillway face
looking west from left abutment

Photo 7
View of spillway face
showing loose stones on apron

Photo 8
View of abandoned penstock and
8 inch diameter pipe looking upstream

Photo 9
View of sluice gate
looking upstream

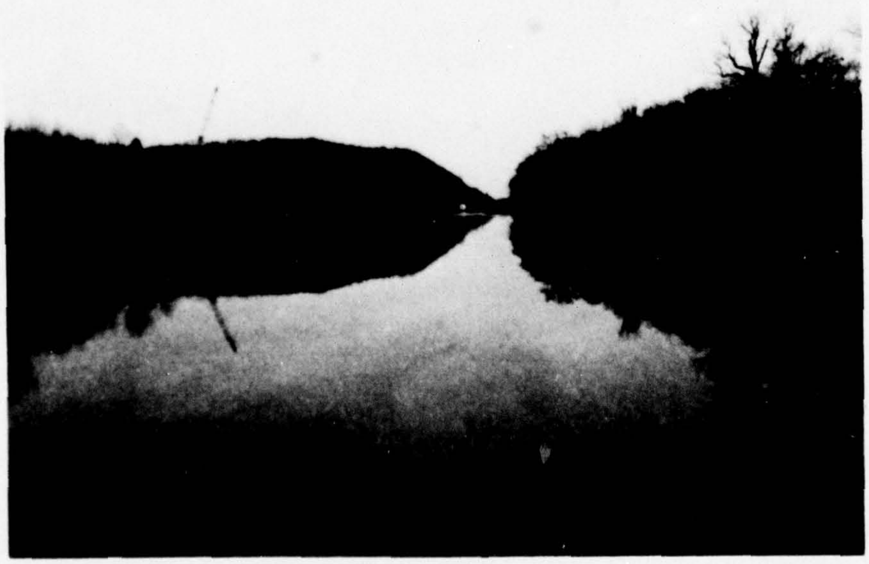


Photo 10
View of reservoir looking upstream from dam

Photo 11
View of road bridge and
Borough of Pompton Lakes downstream from dam

Photo 12
View of dam looking
upstream from bridge shown in Photo 11

APPENDIX C

REGIONAL GEOLOGY - HIGHLANDS PROVINCE

REGIONAL GEOLOGY - HIGHLANDS PROVINCE

Physiography

The New Jersey Highlands extend northeast-southwest across the state from the New York border to the Delaware River. Included in the province are the northwest portions of Hunterdon, Passaic and Morris Counties and the southeastern portions of Warren and Sussex Counties. This province lies between the Appalachian Ridge and Valley Province to the northwest and the Piedmont Lowlands Province to the southeast (See Figure C-1) and is part of the larger New England Physiographic Province.

The Highlands are characterized by rounded and flat-topped northeast-southwest ridges and mountains up to 1,400 feet high separated by narrow valleys. The orientation of the valleys is usually, but not always, controlled by the underlying geologic structure.

Bedrock

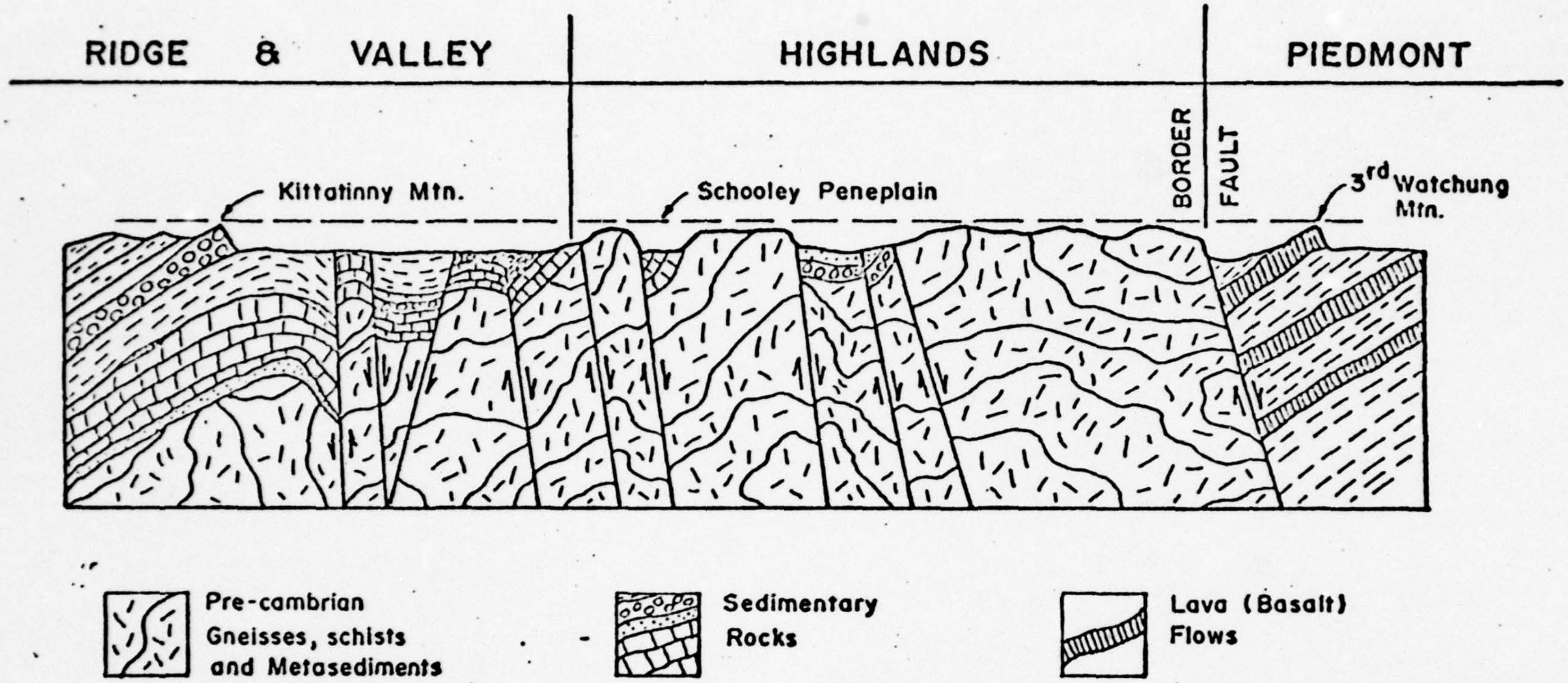
Bedrock of the region is predominently Precambrian gneisses, schists and metasediments. Some sedimentary rocks, typically sandstones, shales and conglomerate have been infolded and infaulted into the valley bottoms.

The regional geologic structure reflects the very old age of bedrock. A number of regional faults cross the area in a northeast-southwest direction. The Ramapo Fault scarp, forming the eastern border of the province, is more than 30 miles long. Faults also control many of the river valley orientations.

Mountain crests slope uniformly from northwest to southwest, a direct result of the fact that the entire area was once part of the now dissected Schooley peneplain.

Overburden

Much of the province was covered by the Pleistocene age Wisconsin glacier. The glacier stripped most of the existing overburden and weathered rock and uncovered the numerous hard bedrock knobs and ridges seen throughout the province. Most of the side-slopes in the area are covered with heavy boulder tills (ground moraine), while glacial outwash and recent alluvium cover the valleys. South of the terminal moraine extending from Morristown to Belvidere, scattered remnants of earlier stages of glaciation (Illinoian and Kansan) have deposited ground moraine (glacial tills) over the bedrock. In the valleys and over some of the ground moraine, recent and glacio-fluvial alluviums have been deposited.



SCHEMATIC CROSS-SECTION OF NEW JERSEY HIGHLANDS PHYSIOGRAPHIC PROVINCE (AFTER WOLFE, 1977)

JENNY / LEEDSHILL
JANUARY 1979

FIGURE C-1

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

LAKE INEZ

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 98.1 SQ. MILES

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 196 FT (300 AF)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 198.5 (460 AF)

ELEVATION MAXIMUM DESIGN POOL:

ELEVATION TOP DAM: 198.5 FT

CREST: SPILLWAY

a. Elevation 196.0
b. Type MASONRY OVERFLOW
c. Width 5'±
d. Length 206 FT
e. Location Spillover CENTER OF DAM
f. Number and Type of Gates NONE

OUTLET WORKS: INOPERABLE

a. Type TIMBER SLUICEWAY
b. Location —
c. Entrance inverts —
d. Exit inverts —
e. Emergency draindown facilities —

HYDROMETEOROLOGICAL GAGES: NONE
a. Type
b. Location
c. Records

MAXIMUM NON-DAMAGING DISCHARGE: 2805 CFS (OVER SPILLWAY + OVER SLUICEWAY)

LAKE INEZ

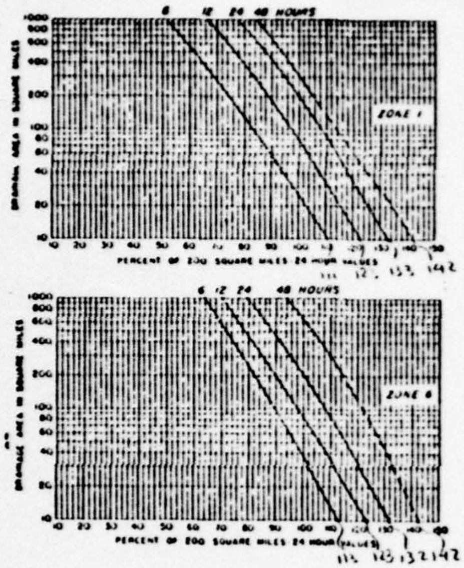


FIGURE 2

SEASONAL VARIATION

DEPTH-AREA-DURATION RELATIONSHIPS

Percentage to be applied to 200 square miles 24 hour probable maximum precipitation values for: THE ALL SEASON ENVELOPE

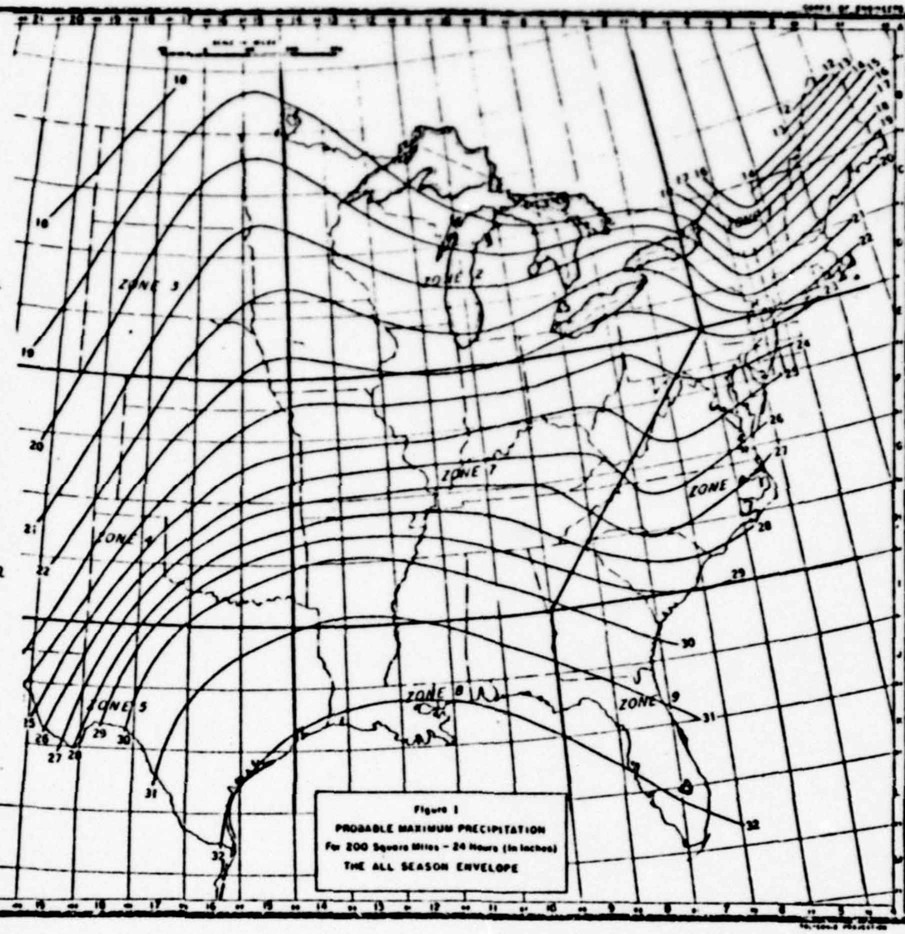


Figure 1

PROBABLE MAXIMUM PRECIPITATION

For 200 Square Miles - 24 Hours (in Inches)

THE ALL SEASON ENVELOPE

RBE 790207 | Lake Inez | 302-03

LEEDS, HILL AND JEWETT, INC.

BY LEE DATE ___ CLIENT New Jersey SHEET NO. ___ OF ___

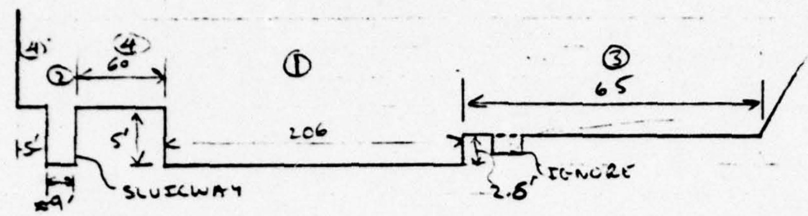
CHKD ___ DATE 7/01/30 JOB Lake Inez JOB NO. 202-01

Channel Cross-Sections ℄

Station	Distance Downstream of Dam (ft)	Mannings "n" Left Over-Bank	Mannings "n" Main Channel	Mannings "n" Right Over-Bank	Channel Invert (ft)	Map Elev. (ft)	Reach Length (ft)	Energy Grade Line Slope	X or Y	1	2	3	4	5	6	7	8
Structure #1																	
2 - ~~[illegible]~~	150	0.1	.045	0.1	257	275	15	.006	X	0	150	490	500	525	535	700	850
									Y	290	280	261	257	257	261	280	290
3	2400	0.1	0.045	0.1	250	280	2250	.004	X	0	1000	1150	1150	1125	1175	1300	1600
									Y	280	260	253	250	250	253	260	280
4	10800	0.1	.045	0.1	216	230	8400	.004	X	0	600	700	700	725	725	900	1700
									Y	230	220	219	216	216	219	220	230
Just Upstream Lake		0.1	.045	0.1	203	340	8600	.002	X	0	1000	1150	1150	1225	1225	1225	1400
									Y	240	220	207	203	203	207	220	240
Downstream of Lake Inez	400	0.05	.045	0.05	183	220	400	.001	X	0	900	950	975	1025	1050	1075	1250
									Y	220	200	190	183	183	190	200	220
	2700	.05	.045	.05	181	220	2300	.001	X	0	50	550	575	625	650	800	2550
℄ Looking Upstream									Y	220	200	190	181	181	190	200	220

D-4

DISCHARGE OVER DAM



$Q = CLH^{1.5}$

C = 3.1 (BROADCRESTED WEIR) (EXCEPT SLUICWAY C = 3.3) ②

ELEV	① H FT	① Q (CFS)	② H FT	② Q (CFS)	③ H FT	③ Q (CFS)	④ H FT	④ Q CFS	Q TOTAL (CFS) [1]
197	1	640	1	30					670
198	2	1810	2	80					1690
198.6	2.6	2680	2.6	125	0	0			2805
199	3	3320	3	155	0.4	50			3525
200	4	5110	4	240	1.4	330			5680
201	5	7140	5	330	2.4	750	0	0	8220
202	6	9390	6	440	3.4	1260	1	200	11290
203	7	11830	7	550	4.4	1860	2	590	14830
206	10	20190	10	940	7.4	4060	5	2250	27440
211	15	37104	15	1725	12.4	8800	10	6370	53995

[1] THIS DISCHARGE ASSUMES NO TAILWATER EFFECTS. IT WAS FOUND TAILWATER AT HIGHER DISCHARGES AFFECTED THE DISCHARGE.

LEEDS, HILL AND JEWETT, INC.

BY RBT DATE 790426 CLIENT New Jersey SHEET NO. 2 OF 6

CHKD. DATE JOB JOB NO. 302-03

Tailwater Effects on Spillway Discharge

Downstream of the dam the channel narrows producing a backwater which submerges the spillway and reduces discharge calculated previously assuming no submergence. In order to determine the tailwater effects on discharge a number of assumptions were made.

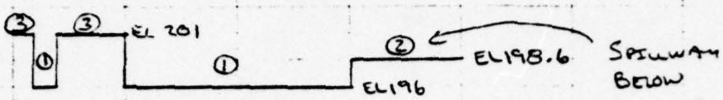
1) For large flows the water surface elevation @ the dam and at the downstream section, 400 ft from the dam are the same.
2) Fig 252 in Design of Small Dams (USBR) can be used to calculate discharge reduction due to submergence for weir flow
3) The streambed elevation below the dam is 183 except at the left abutment which is 3 ft below the wall with an elev. of 195.6

Method: For a given discharge, at the downstream station the depth is obtained from a rating curve using mannings equ. A head over the dam is assumed and the % reduction in discharge is determined graphically (Fig 252 Design of Small Dams) for all three spillways with different crest elevations. The free discharge is determined for each spillway and reduced by the above %. The total corrected discharge should equal the original discharge, if not a new head is assumed until the same discharge is obtained

LEEDS, HILL AND JEWETT, INC.

BY RBE DATE 790426 CLIENT New Jersey SHEET NO. 3 OF 6

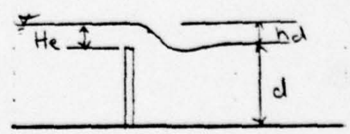
CHKD. DATE JOB JOB NO. 302-03



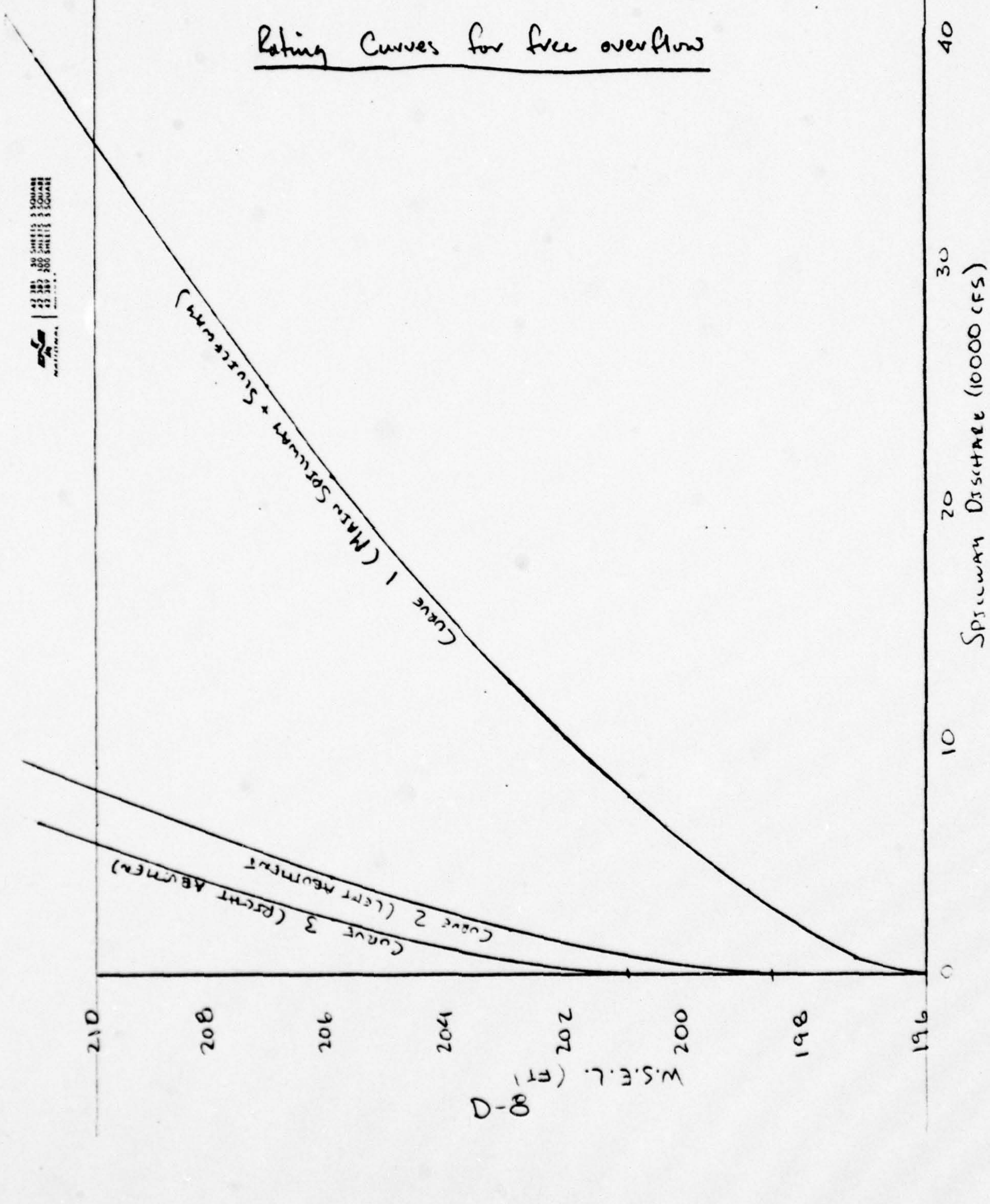
Stream Elev for ① & ③ = 183 FT
② = 195.6 FT

Q@ Bridge CFS [1]	d FT) [1]	Spillway	Assume He	hd+d	hd/He	(hd+d)/He	% Reduc of Q [2]	Q Before Reduction CFS [3]	Total Q CFS [4]
30150	27.26	1	15.1	28.1	0.056	1.86	45	39200	30690
	14.66	2	12.5	15.5	0.067	1.24	42	8900	
	27.26	3	10.1	28.1	.083	2.78	39	6500	OK
24940	25.32	1	13.0	26.0	0.052	2.0	47	33200	24650
	12.72	2	10.4	13.4	0.065	1.29	40	6900	
	25.32	3	8.0	26.0	0.085	3.25	38	4700	OK
20490	23.37	1	11.1	24.1	0.066	2.17	41	25000	20620
	10.77	2	8.5	11.5	0.086	1.35	29	5100	
	23.37	3	6.1	24.1	0.12	3.95	28	3200	OK
13570	19.47	1	7.5	20.5	0.137	2.73	21	13800	13550
	6.87	2	4.9	7.9	0.21	1.61	9	2200	
	19.47	3	2.5	20.5	0.41	8.4	4	900	OK
8690	15.58	1	5.1	18.5	0.494	3.55	2.5	7800	8560
	2.98	2	2.5	5.5	1.01	2.20	0	900	
	15.53	3	0.1	18.1	25.2	181	0	50	OK

[1] From HEC1 Run Assuming no tailwater effects.
[2] From Fig 252 Design of Small Dams, USBR
[3] From rating curves assuming no submergence page 4
[4] Summation of corrected spillway discharges using % reduction of Q



Rating Curves for free overflow



LEEDS, HILL AND JEWETT, INC.

BY RBE DATE 790426 CLIENT New Jersey SHEET NO. 5 OF 6

CHKD. DATE JOB JOB NO. 302-03

1 2 3 4 5 6 7 8 9

NORMAL DEPTH CHANNEL ROUTING @ BRIDGE

HEC-1 OUTPUT

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.1000	.0450	.1000	183.0	220.0	400.	.00100

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 220.00 900.00 200.00 950.00 190.00 975.00 183.00 1025.00 183.00
1050.00 190.00 1100.00 200.00 1250.00 220.00

STORAGE	0.00	1.02	2.29	3.80	5.57	7.68	10.13	12.93	16.08	19.63
	24.61	31.43	40.07	50.54	62.83	76.96	92.91	110.70	130.31	151.74
OUTFLOW	0.00	166.78	560.66	1170.25	2071.51	3320.73	4836.20	6623.50	8698.90	10967.34
	13569.50	16724.25	20487.85	24938.91	30153.95	36205.67	43163.27	51092.94	60058.37	7612[illegible].65
STAGE	183.00	184.95	186.89	188.84	190.79	192.74	194.68	196.63	198.58	200.53
	202.47	204.42	206.37	208.32	210.26	212.21	214.16	216.11	218.05	220.00
FLOW	0.00	166.78	560.66	1170.25	2071.51	3320.73	4836.20	6623.50	8698.90	10967.34
	13569.50	16724.25	20487.85	24938.91	30153.95	36205.67	43163.27	51092.94	60058.37	7612[illegible].65

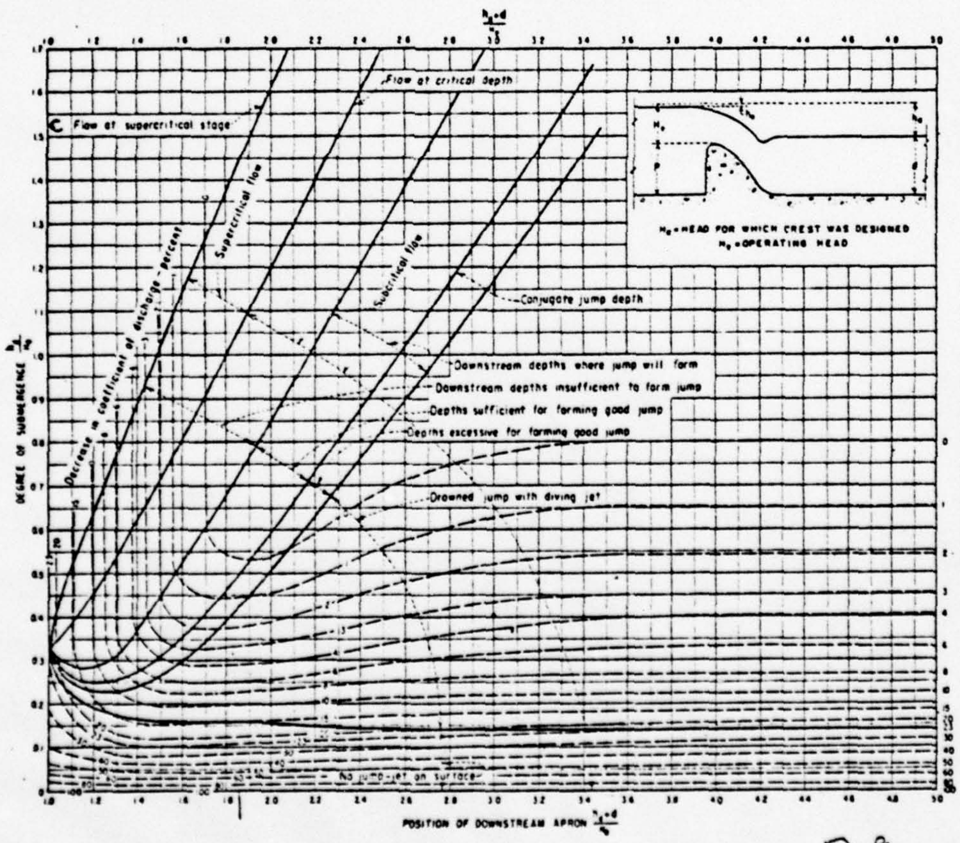
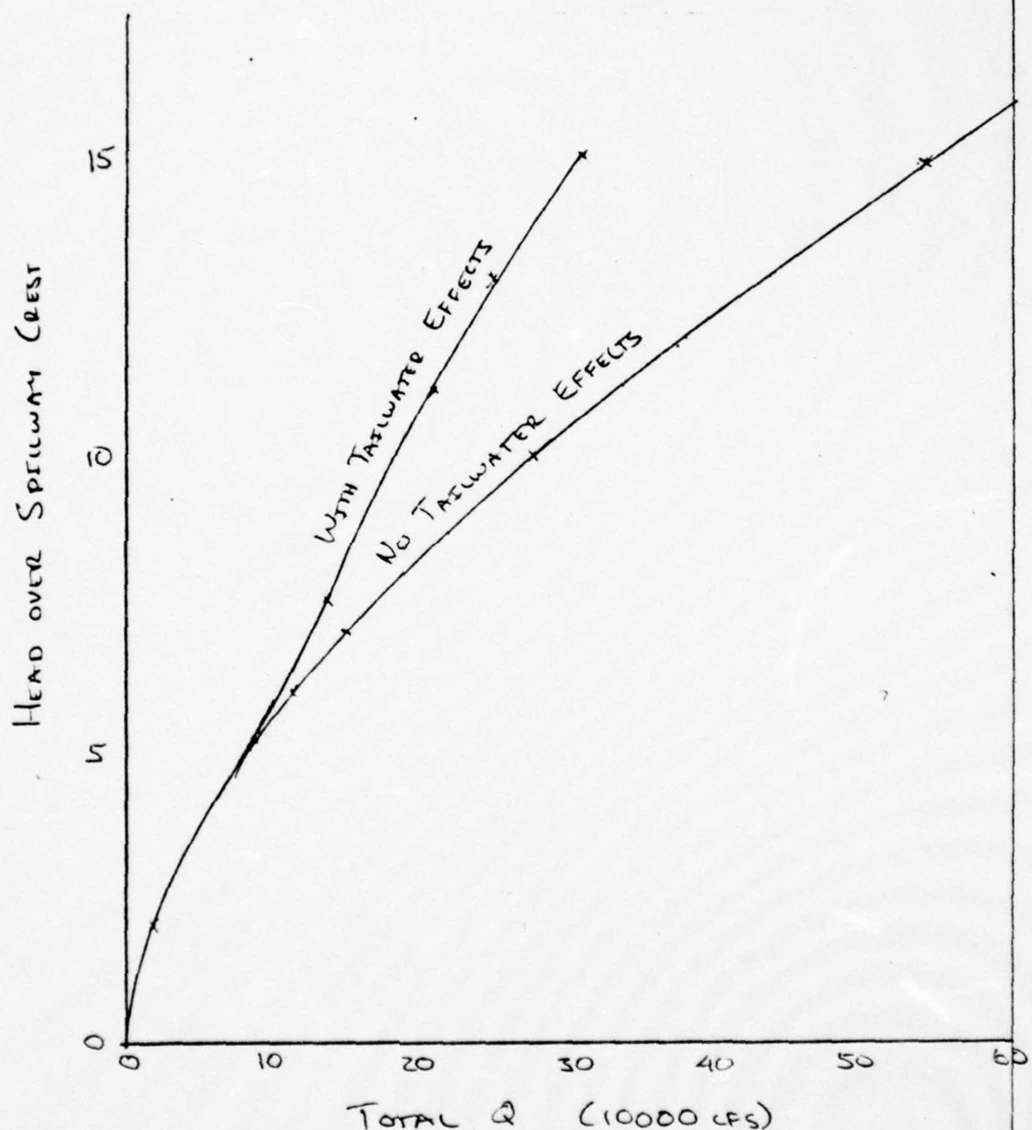


Figure 252. Effects of downstream influences on flow over weir crests. 288-D-2412.

D-9

SPILLWAY RATING CURVE



DRAWDOWN CALCULATIONS

THERE ARE THREE OUTLETS ALL OF WHICH APPEARED INOPERABLE FROM FIELD INSPECTION. ONE OF THESE IS A TIMBER SLUICEWAY WHICH DOES NOT OPERATE BUT COULD BE EASILY DESTROYED IN CASE OF AN EMERGENCY DRAWDOWN. THEREFORE TIME REQUIRED TO CALCULATE DRAWDOWN WILL USE THIS GATE

$Q = CLH^{1.5}$

$C = 3.1$ AT BOTTOM OF SLUICEWAY/BROADCRESTED WEIR

$L = 9.4$ (9.4 FEET FROM INSPECTION REPORT JUNE 2 1960)

ASSUME: 1) NO INFLOWS INTO LAKE
2) NO TAILWATER EFFECTS

$Q = 3.1\,(9.4)\,H^{1.5}$ $\quad Q = \Delta S/\Delta t$

$\Delta S/\Delta t = 29.1\ H^{1.5}$

$\Delta t = (\Delta S / 29.1\ H^{1.5})(43560\ FT^3/AF)(1/3600\ SEC/HR)$

$\Delta t = 0.42\ H^{-1.5}\,\Delta S$

ELEV. (FT)	STO (AF)	ΔSTO (AF)	MEAN HEAD (FT)	ΔTIME (HR)	ΣTIME (HR)
196	300				
		95	13	0.85	
194	205				0.9
		70	11	0.81	
192	135				1.7
		50	9	0.76	
190	85				2.4
		65	6	1.86	
186	20				4.3
		20	1	8.40	
182	0				12.7

DRAWDOWN TIME = 12.7 HR

```
********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION       JULY 1978
  LAST MODIFICATION  25 SEP 78
********************************
A1      NEW JERSEY DAM SAFETY / LAKE INEZ I.D. NO. 00228
A2      HYDRAULIC-HYDROLOGIC ANALYSIS    302-03
A3      PROBABLE MAXIMUM FLOOD
B    300       C      30       0       0       0       0       0       0       0
B1     5
J      1       4       1
J1   0.1    0.25     0.5     1.0
K      0       1                                       1
K1      OUTFLOWS FROM SKYLINE LAKE NO. 1 AND 2
M     -1              2.9             2.9
N
N
N
N
N
N
N                              1      11      51     125     210     282     331
N    361     370     399     519    2253    5684    6961    5443    5992    7682
N  10603    9852    7443    5720    4583    3226    1867    1004     591     449
N    366     300     234     191     156     140
N
N
N
N
N
N
N
N
N
N
N
N
N
N
N
N
N
N
N
N
K      1       2                                       1
K1      CHANNEL ROUTING -MODIFIED PULS- STATION 1 TO 2
Y                              1       1
Y1     1
Y6   0.1   0.045     0.1     257     290     150   0.066
Y7     0     290     150     280     490     261     560     257     525     257
Y7   935     261     700     280    1150     290
K      1       2                                       1
K1      CHANNEL ROUTING -MODIFIED PULS- STATION 2 TO 3
Y                              1       1
```

D-12

```
 51   Y1     1
 52   Y6 0.045   0.045   0.045     250     280    2250   0.004
 53   Y7     0     280    1000     260    1150     253    1150     250    1175     250
 54   Y7  1175     253    1300     260    1600     280
 55   K      1       4                                      1
 56   K1      CHANNEL ROUTING -MODIFIED PULS- STATION 3 TO 4
 57   Y                              1       1
 58   Y1     1
 59   Y6   0.1   0.045     0.1     216     230    8400   0.004
 60   Y7     0     230     560     220     700     219     700     216     7 5     216
 61   Y7   725     219     900     220    1700     230
 62   K      0       5                                      1
 63   K1      OUTFLOWS FROM WANAQUE RESERVOIR
 64   N     -1
 65   N      0       0      10      20      30      40      50      60      70      80
 66   N     90     100     110     120     130     140     150     160     170     180
 67   N    190     200     210     220     230     240     250     260     270     280
 68   N    290     300     310     320     330     340     350     360     370     380
 69   N    390     400     410     420     430     440     450     460     470     480
 70   N    490     500     560     625     685     750     810     875     935    1000
 71   N   1125    1250    1375    1500    1675    1750    1875    2000    2 50    2500
 72   N   2750    3000    3310    3625    3935    4250    4750    5250    5750    6250
 73   N   7310    8375    9435   10500   11750   13000   14250   15500   16  5   17750
 74   N  18875   20000   21250   22500   23750   25000   25624   26250   26 75   27500
 75   N  27700   27900   28100   28300   28225   28150   28075   28000   27 50   27500
 76   N  27250   27000   26525   26250   25875   25500   25060   24625   24 90   23750
 77   N  23375   23000   22625   22250   21875   21500   21125   20750   20 75   20000
 78   N  19625   19250   18875   18500   18125   17750   17375   17000   16 25   16250
 79   N  15875   15500   15125   14750   14500   14250   14000   13750   13 00   13250
 80   N  13000   12750   12500   12250   12000   11750   11560   11375   11 85   11000
 81   N  10750   10500   10250   10000    9875    9750    9625    9500    9 10    9125
 82   N   8935    8750    8585    8425    8260    8100    7975    7850    7 25    7500
 83   N   7475    7350    7225    7100    7000    6900    6800    6700     85    6475
 84   N   6360    6250    6185    6125    6060    6000    5900    5800    5 00    5600
 85   N   5500    5400    5300    5200    5125    5050    4975    4900    4 25    4750
 86   N   4675    4600    4550    4500    4450    4400    4350    4300    4 50    4200
 87   N   4150    4100    4050    4000    3950    3900    3850    3800      50    3700
 88   N   3650    3600    3575    3550    3525    3500    3450    3400    3 50    3300
 89   N   3275    3250    3225    3200    3185    3175    3160    3150    3 35    3125
 90   N   3110    3100    3075    3050    3025    3000    2975    2950    2 25    2900
 91   N   2875    2850    2825    2800    2785    2775    2760    2750    2 35    2725
 92   N   2710    2700    2675    2650    2625    2600    2575    2550    2 25    2500
 93   N   2500    2500    2500    2500    2500    2500    2500    2500    2 00    2500
 94   N   2500    2500    2500    2500    2500    2500    2500    2500    2 00    2500
 95   K      2       6                                      1
 96   K1      COMBINE WANAQUE AND SKYLINE OUTFLOWS
 97   K      1       7                                      1
 98   K1      ROUTING COMBINED OUTFLOWS TO STATION 7 AT LAKE INEZ
 99   Y                              1       1
100   Y1     1
```

```
Y6   C.1   0.045   0.10    203    240   8600   0.002
Y7     0     240   1000    220   1150    207    1150    203   1225    203
Y7  1225     207   1275    220   1400    240
K      0       8                                    1
K1       RUNOFF FROM AREA BETWEEN WANAQUE/SKYLINE AND INEZ
M      1       1    4.8           4.8
P           22.0    112    123    133    142
T                                                 0.5   0.05
W    2.0    0.63
X     -1    -.05    2.0
K      2       9                                    1
K1       COMBINE OUTFLOWS FROM SKYLINE AND WANAQUE WITH RUNOFF
K      1      10                                    1
K1       ROUTING COMBINED FLOWS THROUGH LAKE INEZ
Y                          1      1
Y1     1                                          300     -1
Y4   196     197    198  198.6    199  201.1   203.5  207.1    209  211.1
Y5     0     670   1890   2805   3525   8563   13550  20620  24650  30690
$S     0      10     80    300    550   1000    1630   1800
$E   182     195    190    196    200    205     210  211.1
$$   196
$D 211.1       0    1.5      0
K      1      11                                    1
K1       CHANNEL ROUTING -MODIFIED PULS- STATION 10 TO 11
Y                          1      1
Y1     1
Y6   0.1   0.045    0.1    183    220    400   0.001
Y7     0     220    900    200    950    190     975    183   1025    183
Y7  1050     190   1100    200   1250    220
K      1      12                                    1
K1       CHANNEL ROUTING -MODIFIED PULS- STATION 11 TO 12
Y                          1      1
Y1     1
Y5   0.1   0.045    0.1    181    220   2300   0.001
Y7     0     220     50    200    550    190     575    181    625    181
Y7   650     190    800    200   2550    220
K     99
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

```
RUNOFF HYDROGRAPH AT             1
ROUTE HYDROGRAPH TO              2
ROUTE HYDROGRAPH TO              3
ROUTE HYDROGRAPH TO              4
RUNOFF HYDROGRAPH AT             5
COMBINE  2 HYDROGRAPHS AT        6
ROUTE HYDROGRAPH TO              7
RUNOFF HYDROGRAPH AT             8
COMBINE  2 HYDROGRAPHS AT        9
ROUTE HYDROGRAPH TO             10
ROUTE HYDROGRAPH TO             11
ROUTE HYDROGRAPH TO             12
END OF NETWORK
```

NEW JERSEY DAM SAFETY / LAKE INEZ I.D. NO. 00228
HYDRAULIC-HYDROLOGIC ANALYSIS 302-03
PROBABLE MAXIMUM FLOOD

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
300	0	30	6	0	0	0	0	0	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 4 LRTIO= 1
RTIOS= .10 .25 .50 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

OUTFLOWS FROM SKYLINE LAKE NO. 1 AND 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	2.90	0.00	2.90	0.66	0.000	0	0	0

INPUT HYDROGRAPH

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	11.	51.	125.	210.	282.	331.
361.	370.	399.	519.	1253.	5684.	6901.	9443.	5992.	7682.
10603.	9897.	7443.	5720.	4983.	3226.	1867.	1604.	591.	449.
366.	300.	234.	191.	156.	140.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10603.	6224.	1715.	572.	82340.
CMS	300.	176.	49.	16.	2332.
INCHES		19.96	22.01	22.01	22.01
MM		507.11	559.06	559.06	559.06
AC-FT		3086.	3402.	3402.	3402.
THOUS CU M		3807.	4197.	4197.	4197.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	11.	51.	125.	216.	282.	331.
361.	370.	399.	519.	1253.	9684.	6901.	9443.	9942.	7682.
10603.	9892.	7443.	9720.	4903.	3224.	1467.	1004.	941.	449.
366.	300.	234.	191.	156.	140.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10603.	6224.	1715.	572.	82346.
CMS	300.	176.	49.	16.	2332.
INCHES		19.96	22.01	22.01	22.01
MM		507.11	559.06	559.06	559.06
AC-FT		3086.	3402.	3402.	3402.
THOUS CU M		3807.	4197.	4197.	4197.

HYDROGRAPH ROUTING

CHANNEL ROUTING -MODIFIED PULS- STATION 1 TO 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	1	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	6.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.1000	.0450	.1000	257.0	290.0	150.	.00600

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 290.00 150.00 280.60 490.60 261.00 500.00 257.00 525.00 257.60
935.00 261.00 700.00 280.60 1150.00 290.00

STORAGE	0.00	.18	.40	.74	1.34	2.21	3.16	4.74	6.50	8.44
	10.73	13.26	16.07	19.16	22.62	25.69	31.39	36.71	42.69	44.22
OUTFLOW	0.00	170.02	574.60	1310.03	2444.42	4050.91	6209.49	8492.66	12468.11	16899.96
	21749.53	27675.71	34535.41	42383.81	50217.17	59505.72	70756.67	83744.82	98836.50	115541.46
STAGE	257.00	258.74	260.47	262.21	263.95	265.68	267.42	269.16	270.90	272.63
	274.37	276.11	277.84	279.58	281.32	283.05	284.79	286.53	288.26	290.00
FLOW	0.00	170.02	578.60	1310.03	2444.42	4350.91	6209.49	9492.66	12468.11	16899.96
	21749.53	27675.71	34535.41	42383.81	50217.17	59505.72	70756.67	83744.82	98836.50	115541.46

STATION 2, PLAN 1, RTIO 6

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	11.	49.	123.	219.	281.	330.
341.	370.	396.	517.	1234.	5585.	6065.	5418.	6062.	7632.
16502.	9890.	7465.	5742.	4591.	3253.	1876.	1616.	586.	455.
362.	305.	231.	195.	153.	143.	4.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	3.	4.	3.	3.	4.
6.	5.	4.	3.	3.	2.	1.	1.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STAGE

257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.1	257.5	258.3	258.9	259.2	259.6
259.5	259.6	259.7	260.2	262.0	266.0	267.9	268.4	268.3	269.3
270.0	269.5	268.2	267.0	265.1	264.8	263.1	261.5	260.5	259.9
259.6	259.3	259.0	258.9	258.6	258.5	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	16942.	6723.	1715.	572.	82342.
CMS	300.	170.	49.	16.	2332.
INCHES		19.96	22.01	22.01	22.01
MM		507.06	559.07	559.07	559.07
AC-FT		3096.	3403.	3403.	3403.
THOUS CU M		3807.	4197.	4197.	4197.

MAXIMUM STORAGE = 6.

MAXIMUM STAGE IS 270.0

HYDROGRAPH ROUTING

CHANNEL ROUTING -MODIFIED PULS- STATION 2 TO 3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	1	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0450	.0450	.0450	250.0	280.0	2250.	.00400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 280.00 1000.00 260.00 1150.00 253.00 1150.00 250.00 1175.00 250.00
1175.00 253.00 1300.00 260.00 1600.00 280.00

STORAGE	0.00	2.04	4.10	9.18	19.31	34.50	54.75	80.86	115.03	157.64
	208.61	267.95	335.67	411.75	496.21	589.03	690.23	799.79	917.73	1044.03
OUTFLOW	0.00	103.94	309.90	718.86	1611.79	3208.02	5692.85	9014.95	13744.93	20255.66
	28773.64	39534.49	52761.81	68671.13	87469.97	109358.67	134531.24	163176.02	195476.32	231610.85
STAGE	250.00	251.58	253.16	254.74	256.32	257.89	259.47	261.05	262.63	264.21
	265.79	267.37	268.95	270.53	272.11	273.68	275.26	276.84	278.42	280.00
FLOW	0.00	103.94	309.90	718.86	1611.79	3208.02	5692.85	9014.95	13744.93	20255.66
	28773.64	39534.49	52761.81	68671.13	87469.97	109358.67	134531.24	163176.02	195476.32	231610.85

STATION 3, PLAN 1, RTIO 4

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	6.	31.	89.	188.	267.	314.
352.	369.	388.	475.	987.	4326.	7140.	9765.	9685.	7326.
9927.	10384.	7080.	6029.	4788.	3546.	2187.	1140.	689.	486.
391.	319.	251.	200.	165.	142.	63.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	1.	2.	3.	4.	4.
5.	5.	5.	6.	12.	44.	66.	55.	55.	66.
87.	91.	72.	57.	47.	37.	25.	15.	9.	0.
5.	4.	4.	3.	3.	2.	1.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STAGE

250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.1	250.9	251.3	252.2	252.8	253.2
253.3	253.4	253.5	253.8	255.2	258.5	260.2	259.5	259.5	261.2
261.4	261.5	260.5	259.6	258.9	258.1	256.9	255.6	254.6	253.8
253.5	253.2	252.7	252.3	252.1	251.9	251.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10344.	6198.	1715.	572.	82342.
CMS	294.	176.	49.	16.	2332.
INCHES		19.88	22.01	22.01	22.01
MM		504.99	559.07	559.07	559.07
AC-FT		3073.	3403.	3403.	3403.
THOUS CU M		3791.	4197.	4197.	4197.

MAXIMUM STORAGE = 91.

MAXIMUM STAGE IS 261.5

HYDROGRAPH ROUTING

CHANNEL ROUTING -MODIFIED PULS- STATION 3 TO 4

	ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
	4	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	1	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.1000	.0450	.1000	216.0	230.0	8400.	.00400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 233.00 600.00 220.00 700.00 219.00 700.00 216.00 725.00 216.00
725.00 219.00 900.00 220.00 1700.00 230.00

STORAGE	0.00	3.55	7.10	10.66	14.21	30.17	72.55	130.99	203.87	291.52
	393.43	519.79	642.41	789.69	949.62	1125.22	1315.47	1520.36	1739.95	1974.17
OUTFLOW	0.00	30.29	92.76	176.18	275.45	429.30	755.20	1302.30	2096.67	3137.17
	4402.32	6149.77	8165.18	10557.34	13348.21	16563.05	20225.43	24359.34	28984.24	34125.66
STAGE	216.00	216.74	217.47	218.21	218.95	219.68	220.42	221.16	221.89	222.63
	223.37	224.11	224.84	225.58	226.32	227.05	227.79	228.53	229.26	230.00
FLOW	0.00	30.29	92.76	176.18	275.45	429.30	755.20	1302.30	2096.67	3137.17
	4402.32	6149.77	8165.18	10557.34	13348.21	16563.05	20225.43	24359.34	28984.24	34125.66

STATION 4, PLAN 1, RTIO 4

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	6.	22.	77.	171.	229.
293.	316.	336.	368.	474.	1134.	2348.	4366.	4977.	5673.
7666.	8571.	8854.	7908.	6706.	9521.	4323.	3199.	2293.	1658.
1223.	941.	732.	593.	486.	383.	290.	125.	53.	27.
19.	13.	9.	7.	5.	3.	2.	2.	1.	1.
1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	1.	3.	6.	13.	14.
16.	18.	21.	24.	37.	113.	257.	385.	429.	477.
571.	657.	685.	626.	947.	467.	382.	246.	222.	164.
122.	92.	70.	52.	37.	25.	16.	4.	5.	3.
2.	2.	1.	1.	1.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STAGE

215.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	215.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.3	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.2	216.5	217.3	218.2	218.9
219.6	219.1	219.2	219.4	219.8	220.9	222.4	223.3	223.6	223.3
224.4	225.0	225.1	224.7	224.3	223.9	223.3	222.7	222.0	[illegible]
221.1	220.7	220.4	220.1	219.8	219.5	219.0	217.3	217.0	216.7
216.5	216.3	216.2	216.2	216.1	216.1	216.1	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	215.0	215.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0
216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0	216.0

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8834.	5811.	1715.	572.	82342.
CMS	251.	165.	49.	16.	2332.
INCHES		18.64	22.01	22.01	22.01
MM		473.49	559.06	559.07	559.07
AC-FT		2882.	3403.	3403.	3403.
THOUS CU M		3555.	4197.	4197.	4197.

MAXIMUM STORAGE = 685.

MAXIMUM STAGE IS 229.1

SUB-AREA RUNOFF COMPUTATION

OUTFLOWS FROM WANAQUE RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	0.00	0.00	0.00	0.00	0.000	0	0	0

INPUT HYDROGRAPH

0.	0.	10.	20.	30.	40.	50.	60.	70.	80.
90.	100.	110.	120.	130.	140.	150.	160.	170.	180.
190.	200.	210.	220.	230.	240.	250.	260.	270.	280.
290.	300.	310.	320.	330.	340.	350.	360.	370.	380.
395.	400.	410.	420.	430.	440.	450.	460.	470.	480.
490.	500.	560.	625.	685.	750.	810.	875.	935.	1000.
1125.	1250.	1375.	1500.	1675.	1750.	1875.	2000.	2250.	2500.
2750.	3000.	3310.	3625.	3935.	4250.	4750.	5250.	5750.	6250.
7310.	8375.	9435.	10500.	11750.	13000.	14250.	15500.	16625.	17750.
18975.	20000.	21250.	22500.	23750.	25000.	25524.	26250.	26875.	27500.
27700.	27900.	28100.	28330.	28225.	28150.	28075.	28000.	27750.	27500.
27250.	27000.	26625.	26250.	25875.	25500.	25060.	24625.	24190.	23750.
23375.	23000.	22625.	22250.	21875.	21500.	21125.	20750.	20375.	20030.
19625.	19750.	18675.	18500.	18125.	17750.	17375.	17000.	16625.	15250.
15875.	15590.	15125.	14750.	14500.	14250.	14000.	13750.	13500.	13250.
13000.	12750.	12500.	12250.	12000.	11750.	11560.	11375.	11185.	11000.
10750.	10500.	10250.	10000.	9875.	9750.	9625.	9500.	9310.	9125.
8935.	8750.	8585.	8425.	8260.	8100.	7975.	7850.	7725.	7600.
7475.	7350.	7225.	7100.	7000.	6900.	6800.	6700.	6605.	6475.
6360.	6250.	6185.	6125.	6060.	6000.	5960.	5800.	5700.	5600.
5500.	5400.	5300.	5200.	5125.	5050.	4975.	4900.	4825.	4750.
4675.	4600.	4550.	4500.	4450.	4400.	4350.	4300.	4250.	4200.
4150.	4100.	4050.	4000.	3950.	3900.	3850.	3800.	3750.	3700.
3650.	3600.	3575.	3550.	3525.	3500.	3450.	3400.	3350.	3300.
3275.	3250.	3225.	3200.	3185.	3175.	3160.	3150.	3133.	3125.
3110.	3100.	3075.	3050.	3025.	3000.	2975.	2950.	2925.	2900.
2875.	2850.	2825.	2800.	2785.	2775.	2760.	2750.	2735.	2725.
2710.	2700.	2675.	2650.	2625.	2600.	2575.	2550.	2525.	2500.
2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.
2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	28330.	27855.	23692.	13791.	2281984.
CMS	801.	789.	671.	391.	64619.
INCHES		.00	.00	.00	.00
MM		.00	.00	.00	.00
AC-FT		13813.	46992.	82065.	94297.
THOUS CU M		17037.	57963.	101225.	116313.

HYDROGRAPH AT STA 5 FOR PLAN 1, RTIO 4

0.	0.	10.	20.	30.	40.	50.	60.	70.	80.
90.	100.	110.	120.	130.	140.	150.	160.	170.	180.
190.	200.	210.	220.	230.	240.	250.	260.	270.	280.
290.	300.	310.	320.	330.	340.	350.	360.	370.	380.
390.	400.	410.	420.	430.	440.	450.	460.	470.	480.
490.	500.	560.	625.	685.	750.	810.	875.	935.	1000.
1125.	1250.	1375.	1500.	1675.	1750.	1875.	2000.	2250.	2500.
2750.	3000.	3310.	3625.	3935.	4250.	4750.	5250.	5755.	6250.
7310.	8375.	9435.	10500.	11750.	13000.	14250.	15500.	16625.	17750.
18975.	20000.	21250.	22500.	23750.	25000.	25624.	26250.	26875.	27500.
27700.	27900.	28100.	28100.	28225.	28150.	28075.	28000.	27750.	27500.
27250.	27000.	26625.	26250.	25875.	25500.	25060.	24625.	24190.	23750.
23375.	23000.	22625.	22250.	21875.	21500.	21125.	20750.	20375.	20000.
19625.	19250.	18875.	18500.	18125.	17750.	17375.	17000.	16625.	16250.
15875.	15500.	15125.	14750.	14500.	14250.	14000.	13750.	13500.	13250.
13000.	12750.	12500.	12250.	12000.	11750.	11560.	11375.	11185.	11000.
10750.	10500.	10250.	10000.	9875.	9750.	9625.	9500.	9310.	9125.
8935.	8750.	8585.	8425.	8260.	8100.	7975.	7850.	7725.	7600.
7475.	7350.	7225.	7100.	7000.	6900.	6800.	6710.	6685.	6475.
6350.	6250.	6185.	6125.	6060.	6000.	5900.	5800.	5700.	5600.
5500.	5400.	5300.	5200.	5125.	5050.	4975.	4900.	4825.	4750.
4675.	4600.	4555.	4500.	4450.	4400.	4355.	4300.	4255.	4200.
4150.	4100.	4050.	4000.	3950.	3900.	3850.	3800.	3750.	3700.
3650.	3600.	3575.	3550.	3525.	3500.	3450.	3400.	3350.	3300.
3275.	3250.	3225.	3200.	3185.	3175.	3160.	3150.	3135.	3125.
3110.	3100.	3075.	3050.	3025.	3000.	2975.	2950.	2925.	2900.
2875.	2850.	2825.	2800.	2785.	2775.	2760.	2750.	2735.	2725.
2710.	2700.	2675.	2650.	2625.	2600.	2575.	2550.	2525.	2500.
2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.
2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	28330.	27855.	23692.	13791.	2281984.
CMS	801.	789.	671.	391.	64619.
INCHES		.00	.00	.00	.00
MM		.00	.00	.00	.00
AC-FT		13812.	46992.	82665.	94297.
THOUS CU M		17037.	57963.	101229.	116313.

AD-A069 943 NEW JERSEY STATE DEPT OF ENVIRONMENTAL PROTECTION TRENTON F/G 13/2
NATIONAL DAM SAFETY PROGRAM. LAKE INEZ DAM (NJ-00228), PASSAIC --ETC(U)
MAY 79 R J JENNY DACW61-78-C-0124

UNCLASSIFIED NL

2 OF 2
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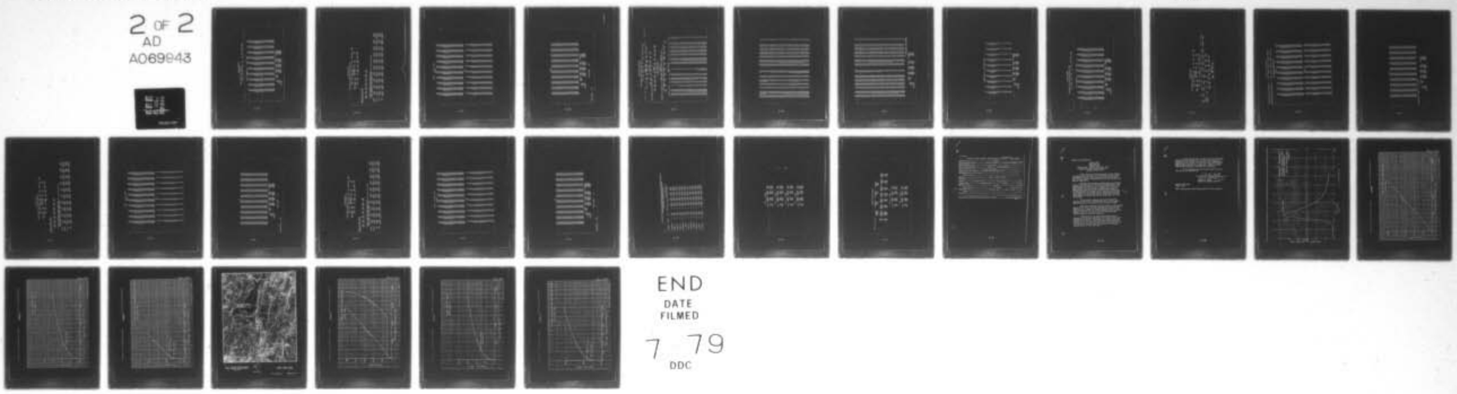

END
DATE
FILMED
7 79
DDC

COMBINE HYDROGRAPHS

COMBINE MANAQUE AND SKYLINE OUTFLOWS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	2	0	0	0	0	1	0	0

SUM OF 2 HYDROGRAPHS AT 6 PLAN 1 RTIO 4

0.	0.	10.	20.	30.	40.	50.	60.	73.	80.
96.	199.	110.	120.	130.	140.	150.	160.	173.	190.
190.	200.	210.	220.	230.	240.	250.	260.	273.	280.
290.	300.	310.	320.	330.	340.	350.	360.	373.	383.
390.	400.	410.	420.	430.	443.	450.	460.	473.	480.
496.	500.	560.	625.	685.	750.	813.	875.	935.	1000.
1125.	1250.	1375.	1500.	1676.	1756.	1847.	2677.	2421.	2759.
3043.	3316.	3646.	3993.	4413.	5384.	7530.	9616.	10727.	11423.
14376.	16944.	19299.	18408.	18456.	18521.	18573.	18699.	14924.	14408.
20640.	20941.	21982.	23393.	24230.	25303.	25914.	26375.	26929.	27527.
27719.	27913.	29109.	26307.	26236.	28193.	28677.	28612.	27751.	28501.
27251.	27000.	26625.	26250.	25875.	25500.	25060.	24625.	24198.	23750.
23375.	23000.	22625.	22250.	21875.	21500.	21125.	20750.	20375.	20330.
19625.	19250.	19875.	19500.	18125.	17753.	17375.	17000.	16625.	16250.
15875.	15500.	15125.	14750.	14500.	14250.	14000.	13756.	13500.	13250.
13000.	12750.	12500.	12250.	12000.	11750.	11500.	11375.	11185.	11350.
10750.	10500.	10250.	10000.	9875.	9750.	9625.	9500.	9310.	9125.
8435.	9750.	9585.	8425.	8260.	8100.	7975.	7890.	7725.	7669.
7475.	7350.	7225.	7100.	7000.	6900.	6500.	6700.	6685.	6475.
6360.	6250.	6185.	6125.	6060.	6000.	5900.	5800.	5763.	5600.
5500.	5400.	5300.	5200.	5125.	5050.	4975.	4400.	4825.	4750.
4675.	4400.	4590.	4500.	4450.	4400.	4350.	4300.	4253.	4200.
4150.	4100.	4650.	4000.	3950.	3900.	3850.	3800.	3753.	3700.
3650.	3600.	3575.	3550.	3525.	3500.	3450.	3400.	3353.	3300.
3275.	3250.	3225.	3200.	3185.	3175.	3160.	3150.	3135.	3125.
3110.	3100.	3675.	3050.	3625.	3000.	2975.	2950.	2925.	2900.
2875.	2950.	2825.	2800.	2785.	2775.	2760.	2750.	2735.	2725.
2710.	2700.	2675.	2650.	2625.	2600.	2575.	2550.	2525.	2500.
2500.	2500.	2500.	2566.	2566.	2500.	2500.	2500.	2503.	2500.
2500.	2500.	2500.	2500.	2506.	2500.	2500.	2500.	2503.	2500.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	28337.	27865.	23890.	14348.	2364326.
CMS	802.	789.	677.	406.	66950.
INCHES		89.30	306.63	552.20	632.00
MM		2270.30	7788.30	14027.98	16052.89
AC-FT		13817.	47401.	85376.	97699.
THOUS CU M		17043.	58468.	105309.	120510.

HYDROGRAPH ROUTING

ROUTING COMBINED OUTFLOWS TO STATION 7 AT LAKE INEZ

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
7	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	6	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.1000	.0453	.1000	203.0	240.0	8600.	.00200

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 243.00 1069.30 220.60 1150.00 207.00 1150.00 203.00 1225.00 203.00
1225.00 207.00 1275.70 220.60 1400.60 240.00

STORAGE	0.00	24.94	57.67	91.06	137.15	194.10	262.60	342.73	434.29	538.49
	676.66	856.94	1079.34	1343.85	1650.47	1999.21	2390.07	2823.03	3298.12	3815.31
OUTFLOW	0.00	326.07	1002.47	1983.42	3209.14	4946.69	6982.14	9420.67	12240.83	15417.00
	18865.85	23251.37	28619.86	35062.79	42686.63	51593.65	61884.59	73657.14	87005.98	102023.01
STAGE	203.00	204.95	206.89	208.94	210.79	212.74	214.68	216.63	218.58	220.53
	222.47	224.42	226.37	228.32	230.26	232.21	234.16	236.11	238.05	240.00
FLOW	0.00	326.07	1002.47	1983.42	3209.14	4946.69	6982.14	9420.67	12240.83	15417.00
	18865.85	23251.37	28619.86	35062.79	42686.63	51593.65	61884.59	73657.14	87005.98	102023.01

STATION 7, PLAN 1, RTIO 4

OUTFLOW

0.	0.	2.	7.	14.	22.	31.	40.	49.	59.
69.	79.	89.	99.	109.	119.	129.	139.	149.	159.
169.	179.	189.	199.	209.	219.	229.	239.	249.	259.
269.	279.	289.	299.	309.	319.	330.	346.	359.	369.
380.	390.	400.	410.	420.	430.	440.	450.	463.	470.
490.	498.	515.	565.	624.	685.	747.	809.	872.	936.
1020.	1149.	1270.	1395.	1539.	1671.	1787.	1937.	2109.	2443.
2796.	3081.	3370.	3710.	4346.	4694.	6094.	8613.	9695.	16973.
12673.	14962.	16020.	17060.	18249.	18412.	18566.	18594.	18742.	19428.
19513.	20196.	21643.	22042.	23129.	24745.	25179.	25022.	26376.	26942.
27395.	27475.	27899.	28405.	28263.	28199.	28163.	28074.	27942.	27732.
27405.	27240.	26959.	26462.	26246.	25975.	25679.	25099.	24626.	24189.
23772.	23393.	23002.	22624.	22249.	21873.	21498.	21123.	20748.	20373.
19998.	19623.	19249.	18973.	18492.	18115.	17739.	17364.	16989.	16614.
16239.	15956.	15409.	15079.	14730.	14456.	14203.	13952.	13701.	13451.
13261.	12951.	12771.	12551.	12199.	11965.	11717.	11521.	11332.	11144.
10433.	10691.	10443.	10193.	9992.	9851.	9723.	9947.	9446.	9269.
9686.	8999.	8720.	8554.	8341.	8220.	8081.	7951.	7829.	7699.
7974.	7449.	7324.	7199.	7094.	6983.	6961.	6783.	6715.	6612.
6606.	6369.	6240.	6177.	6113.	6050.	5974.	5906.	5701.	5601.
5901.	5491.	5301.	5201.	5191.	5112.	5036.	4961.	4887.	4812.
4737.	4662.	4597.	4543.	4492.	4442.	4392.	4342.	4292.	4242.
4192.	4142.	4692.	4042.	3992.	3942.	3892.	3842.	3792.	3742.
3692.	3647.	3601.	3572.	3546.	3521.	3496.	3446.	3396.	3342.
3301.	3272.	3246.	3221.	3200.	3185.	3172.	3159.	3147.	3134.
3122.	3109.	3093.	3070.	3046.	3021.	2996.	2971.	2945.	2921.
2896.	2871.	2846.	2821.	2800.	2785.	2772.	2759.	2747.	2734.
2722.	2709.	2693.	2676.	2646.	2621.	2596.	2571.	2546.	2521.
2505.	2581.	2500.	2500.	2506.	2500.	2500.	2566.	2565.	2560.
2566.	2500.	2500.	2506.	2566.	2563.	2500.	2566.	2563.	2500.

STOR

0.	0.	0.	1.	1.	2.	3.	4.	4.	5.
6.	7.	8.	9.	10.	10.	11.	12.	13.	14.
15.	16.	17.	18.	18.	19.	20.	21.	22.	23.
24.	25.	26.	26.	27.	28.	29.	30.	33.	31.
31.	32.	32.	32.	33.	33.	34.	34.	35.	35.
35.	36.	37.	39.	42.	44.	47.	49.	52.	55.
59.	63.	67.	71.	76.	81.	89.	96.	99.	109.
120.	130.	140.	152.	164.	185.	232.	297.	351.	392.
447.	523.	595.	636.	652.	650.	662.	666.	672.	683.
703.	731.	766.	807.	852.	899.	937.	963.	986.	1010.
1029.	1040.	1050.	1058.	1063.	1062.	1060.	1057.	1051.	1042.
1033.	1023.	1011.	990.	981.	966.	947.	932.	914.	896.
879.	862.	847.	831.	816.	860.	785.	764.	754.	739.
723.	708.	692.	677.	662.	647.	632.	616.	601.	586.
571.	555.	541.	527.	516.	507.	498.	490.	481.	473.
465.	456.	448.	446.	431.	423.	416.	410.	404.	398.
391.	393.	375.	367.	361.	356.	352.	340.	344.	330.
332.	326.	320.	314.	309.	364.	299.	294.	290.	286.
282.	278.	274.	270.	266.	263.	259.	256.	254.	250.
245.	241.	239.	236.	233.	231.	229.	226.	222.	219.
216.	212.	209.	205.	202.	200.	197.	195.	192.	190.
187.	189.	182.	180.	179.	177.	175.	173.	172.	170.
169.	166.	165.	163.	161.	160.	158.	156.	154.	153.
151.	149.	148.	147.	146.	145.	144.	142.	141.	139.
130.	137.	136.	135.	134.	134.	133.	133.	132.	132.
131.	131.	130.	130.	129.	128.	127.	126.	125.	124.
123.	123.	122.	121.	120.	120.	119.	119.	118.	118.
117.	117.	116.	115.	115.	114.	113.	112.	111.	110.
110.	110.	110.	110.	110.	110.	110.	110.	110.	110.
110.	110.	110.	110.	116.	110.	110.	110.	110.	110.

STAGE

203.0	203.0	203.0	203.0	203.1	203.1	203.2	203.2	203.3	203.4
203.4	203.5	203.5	203.6	203.6	203.7	203.8	203.9	203.9	203.9
204.0	204.1	204.1	204.2	204.2	204.3	204.4	204.4	204.5	204.5
204.6	204.7	204.7	204.8	204.8	204.9	205.0	205.0	205.0	205.1
205.1	205.1	205.2	205.2	205.2	205.2	205.3	205.3	205.3	205.4
205.4	205.4	205.5	205.6	205.8	206.0	206.2	206.3	206.5	206.7
206.9	207.2	207.4	207.7	208.0	208.2	208.5	208.7	209.1	209.6
210.1	210.5	210.9	211.3	211.7	212.4	213.6	215.5	216.8	217.7
219.0	220.2	221.3	221.9	222.1	222.2	222.3	222.3	222.4	222.5
222.8	223.1	223.4	223.9	224.4	224.8	225.1	225.4	225.6	225.8
225.9	226.0	226.1	226.2	226.2	226.2	226.2	226.2	226.1	226.0
226.0	225.9	225.8	225.6	225.5	225.4	225.2	225.1	224.9	224.8
224.6	224.5	224.3	224.1	224.0	223.8	223.6	223.5	223.3	223.1
223.0	222.8	222.6	222.5	222.3	222.0	221.8	221.6	221.4	221.2
221.0	220.9	220.6	220.3	220.1	219.9	219.8	219.6	219.5	219.3
219.1	219.0	218.8	218.7	218.5	218.3	218.2	218.1	217.9	217.8
217.7	217.5	217.3	217.2	217.0	216.9	216.8	216.8	216.6	216.5
216.4	216.2	216.1	215.9	215.8	215.7	215.6	215.5	215.4	215.3
215.2	215.1	215.0	214.9	214.8	214.7	214.6	214.5	214.4	214.3
214.2	214.1	214.0	213.9	213.9	213.8	213.7	213.6	213.5	213.4
213.3	213.2	213.2	213.1	213.0	212.9	212.8	212.8	212.7	212.6
212.5	212.4	212.3	212.3	212.2	212.1	212.1	212.0	212.0	211.9
211.8	211.8	211.7	211.7	211.6	211.6	211.5	211.4	211.4	211.3
211.3	211.2	211.2	211.1	211.1	211.1	211.0	211.0	210.9	210.9
210.8	210.8	210.7	210.7	210.7	210.6	210.6	210.6	210.6	210.6
210.5	210.5	210.5	210.5	210.4	210.4	210.4	210.3	210.3	210.2
210.2	210.2	210.1	210.1	210.1	210.0	210.0	210.0	210.0	210.0
209.9	209.9	209.9	209.9	209.8	209.8	209.8	209.7	209.7	209.6
209.6	209.6	209.6	209.6	209.6	209.6	209.6	209.6	209.6	209.6
209.6	209.6	209.6	209.6	209.6	209.6	209.6	209.6	209.6	209.6

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	28213.	27831.	23893.	16347.	2361672.
CMS	799.	788.	677.	466.	66875.
INCHES		89.27	306.57	552.24	631.29
MM		2267.52	7786.87	14026.74	16034.69
AC-FT		13800.	47392.	85366.	97540.
THOUS CU M		17022.	58457.	105360.	120375.

MAXIMUM STORAGE = 1063.

MAXIMUM STAGE IS 226.2

D-28

SUB-AREA RUNOFF COMPUTATION

RUNOFF FROM AREA BETWEEN WANAQUE/SKYLINE AND INEZ

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
0	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	4.03	0.00	4.03	0.00	0.600	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.00	112.00	123.00	133.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .000

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

UNIT HYDROGRAPH DATA
TP= 2.00 CP= .63 NTA= 0

RECESSION DATA
STRTQ= -1.00 QRCSN= -.05 RTIOR= 2.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 4.79 AND R= 3.37 INTERVALS

UNIT HYDROGRAPH 21 END-OF-PERIOD ORDINATES, LAG= 1.99 HOURS, CP= .63 VOL= 1.00

100.	309.	719.	952.	969.	792.	597.	435.	323.	239.
178.	132.	98.	72.	54.	40.	30.	22.	15.	12.
9.									

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.30	1	.00	0.00	.00	4.	1.04	3.30	151	0.00	0.00	0.00	16.
1.01	1.00	2	.00	0.00	.00	4.	1.04	4.00	152	0.00	0.00	0.00	15.
1.01	1.30	3	.00	0.00	.00	4.	1.04	4.30	153	0.00	0.00	0.00	14.
1.01	2.00	4	.00	0.00	.00	4.	1.04	5.00	154	0.00	0.00	0.00	13.
1.01	2.30	5	.00	0.00	.00	3.	1.04	5.30	155	0.00	0.00	0.00	12.
1.01	3.00	6	.00	0.00	.00	3.	1.04	6.00	156	0.00	0.00	0.00	11.
1.01	3.30	7	.00	0.00	.00	3.	1.04	6.30	157	0.00	0.00	0.00	10.
1.01	4.00	8	.00	0.00	.00	3.	1.04	7.00	158	0.00	0.00	0.00	10.
1.01	4.30	9	.00	0.00	.00	3.	1.04	7.30	159	0.00	0.00	0.00	9.
1.01	5.00	10	.00	0.00	.00	2.	1.04	8.00	160	0.00	0.00	0.00	8.
1.01	5.30	11	.00	0.00	.00	2.	1.04	8.30	161	0.00	0.00	0.00	8.
1.01	6.00	12	.00	0.00	.00	2.	1.04	9.00	162	0.00	0.00	0.00	7.
1.01	6.30	13	.01	0.00	.01	2.	1.04	9.30	163	0.00	0.00	0.00	7.
1.01	7.00	14	.01	0.00	.01	2.	1.04	10.00	164	0.00	0.00	0.00	6.
1.01	7.30	15	.01	0.00	.01	2.	1.04	10.30	165	0.00	0.00	0.00	6.
1.01	8.00	16	.01	0.00	.01	2.	1.04	11.00	166	0.00	0.00	0.00	6.
1.01	8.30	17	.01	0.00	.01	1.	1.04	11.30	167	0.00	0.00	0.00	5.
1.01	9.00	18	.01	0.00	.01	1.	1.04	12.00	168	0.00	0.00	0.00	5.
1.01	9.30	19	.01	0.00	.01	1.	1.04	12.30	169	0.00	0.00	0.00	5.
1.01	10.00	20	.01	0.00	.01	1.	1.04	13.00	170	0.00	0.00	0.00	4.
1.01	10.30	21	.01	0.00	.01	1.	1.04	13.30	171	0.00	0.00	0.00	4.
1.01	11.00	22	.01	0.00	.01	1.	1.04	14.00	172	0.00	0.00	0.00	4.
1.01	11.30	23	.01	0.00	.01	1.	1.04	14.30	173	0.00	0.00	0.00	3.
1.01	12.00	24	.01	0.00	.01	1.	1.04	15.00	174	0.00	0.00	0.00	3.
1.01	12.30	25	.07	0.00	.07	1.	1.04	15.30	175	0.00	0.00	0.00	3.
1.01	13.00	26	.07	0.00	.07	1.	1.04	16.00	176	0.00	0.00	0.00	3.
1.01	13.30	27	.08	0.00	.08	1.	1.04	16.30	177	0.00	0.00	0.00	3.
1.01	14.00	28	.08	0.00	.08	1.	1.04	17.00	178	0.00	0.00	0.00	2.
1.01	14.30	29	.10	.05	.05	6.	1.04	17.30	179	0.00	0.00	0.00	2.
1.01	15.00	30	.11	.08	.03	36.	1.04	18.00	180	0.00	0.00	0.00	2.
1.01	15.30	31	.12	.10	.03	79.	1.04	18.30	181	0.00	0.00	0.00	2.
1.01	16.00	32	.39	.36	.03	182.	1.04	19.00	182	0.00	0.00	0.00	2.
1.01	16.30	33	.09	.07	.03	340.	1.04	19.30	183	0.00	0.00	0.00	2.
1.01	17.00	34	.09	.07	.03	500.	1.04	20.00	184	0.00	0.00	0.00	2.
1.01	17.30	35	.07	.05	.03	600.	1.04	20.30	185	0.00	0.00	0.00	1.
1.01	18.00	36	.07	.05	.03	630.	1.04	21.00	186	0.00	0.00	0.00	1.
1.01	18.30	37	.01	0.00	.01	577.	1.04	21.30	187	0.00	0.00	0.00	1.
1.01	19.00	38	.01	0.00	.01	492.	1.04	22.00	188	0.00	0.00	0.00	1.
1.01	19.30	39	.01	0.00	.01	403.	1.04	22.30	189	0.00	0.00	0.00	1.
1.01	20.00	40	.01	0.00	.01	315.	1.04	23.00	190	0.00	0.00	0.00	1.

1.03	0.00	96	.00	.00	.03	931.	1.06	3.00	246	0.00	0.00	0.00	0.
1.03	.30	97	0.00	0.00	0.00	770.	1.06	3.30	247	0.00	0.00	0.00	0.
1.03	1.00	98	0.00	0.00	0.00	641.	1.06	4.00	248	0.00	0.00	0.00	0.
1.03	1.30	99	0.00	0.00	0.00	577.	1.06	4.30	249	0.00	0.00	0.00	0.
1.03	2.00	100	0.00	0.00	0.00	519.	1.06	5.00	250	0.00	0.00	0.00	0.
1.03	2.30	101	0.00	0.00	0.00	562.	1.06	5.30	251	0.00	0.00	0.00	0.
1.03	3.00	102	0.00	0.00	0.00	509.	1.06	6.00	252	0.00	0.00	0.00	0.
1.03	3.30	103	0.00	0.00	0.00	437.	1.06	6.30	253	0.00	0.00	0.00	0.
1.03	4.00	104	0.00	0.00	0.00	460.	1.06	7.00	254	0.00	0.00	0.00	0.
1.03	4.30	105	0.00	0.00	0.00	391.	1.06	7.30	255	0.00	0.00	0.00	0.
1.03	5.00	106	0.00	0.00	0.00	355.	1.06	8.00	256	0.00	0.00	0.00	0.
1.03	5.30	107	0.00	0.00	0.00	332.	1.06	8.30	257	0.00	0.00	0.00	0.
1.03	6.00	108	0.00	0.00	0.00	309.	1.06	9.00	258	0.00	0.00	0.00	0.
1.03	6.30	109	0.00	0.00	0.00	289.	1.06	9.30	259	0.00	0.00	0.00	0.
1.03	7.00	110	0.00	0.00	0.00	269.	1.06	10.00	260	0.00	0.00	0.00	0.
1.03	7.30	111	0.00	0.00	0.00	251.	1.06	10.30	261	0.00	0.00	0.00	0.
1.03	8.00	112	0.00	0.00	0.00	234.	1.06	11.00	262	0.00	0.00	0.00	0.
1.03	8.30	113	0.00	0.00	0.00	219.	1.06	11.30	263	0.00	0.00	0.00	0.
1.03	9.00	114	0.00	0.00	0.00	204.	1.06	12.00	264	0.00	0.00	0.00	0.
1.03	9.30	115	0.00	0.00	0.00	190.	1.06	12.30	265	0.00	0.00	0.00	0.
1.03	10.00	116	0.00	0.00	0.00	179.	1.06	13.00	266	0.00	0.00	0.00	0.
1.03	10.30	117	0.00	0.00	0.00	166.	1.06	13.30	267	0.00	0.00	0.00	0.
1.03	11.00	118	0.00	0.00	0.00	155.	1.06	14.00	268	0.00	0.00	0.00	0.
1.03	11.30	119	0.00	0.00	0.00	144.	1.06	14.30	269	0.00	0.00	0.00	0.
1.03	12.00	120	0.00	0.00	0.00	135.	1.06	15.00	270	0.00	0.00	0.00	0.
1.03	12.30	121	0.00	0.00	0.00	126.	1.06	15.30	271	0.00	0.00	0.00	0.
1.03	13.00	122	0.00	0.00	0.00	117.	1.06	16.00	272	0.00	0.00	0.00	0.
1.03	13.30	123	0.00	0.00	0.00	109.	1.06	16.30	273	0.00	0.00	0.00	0.
1.03	14.00	124	0.00	0.00	0.00	102.	1.06	17.00	274	0.00	0.00	0.00	0.
1.03	14.30	125	0.00	0.00	0.00	95.	1.06	17.30	275	0.00	0.00	0.00	0.
1.03	15.00	126	0.00	0.00	0.00	89.	1.06	18.00	276	0.00	0.00	0.00	0.
1.03	15.30	127	0.00	0.00	0.00	83.	1.06	18.30	277	0.00	0.00	0.00	0.
1.03	16.00	128	0.00	0.00	0.00	77.	1.06	19.00	278	0.00	0.00	0.00	0.
1.03	16.30	129	0.00	0.00	0.00	73.	1.06	19.30	279	0.00	0.00	0.00	0.
1.03	17.00	130	0.00	0.00	0.00	67.	1.06	20.00	280	0.00	0.00	0.00	0.
1.03	17.30	131	0.00	0.00	0.00	63.	1.06	20.30	281	0.00	0.00	0.00	0.
1.03	18.00	132	0.00	0.00	0.00	59.	1.06	21.00	282	0.00	0.00	0.00	0.
1.03	18.30	133	0.00	0.00	0.00	55.	1.06	21.30	283	0.00	0.00	0.00	0.
1.03	19.00	134	0.00	0.00	0.00	51.	1.06	22.00	284	0.00	0.00	0.00	0.
1.03	19.30	135	0.00	0.00	0.00	48.	1.06	22.30	285	0.00	0.00	0.00	0.
1.03	20.00	136	0.00	0.00	0.00	44.	1.06	23.00	286	0.00	0.00	0.00	0.
1.03	20.30	137	0.00	0.00	0.00	41.	1.06	23.30	287	0.00	0.00	0.00	0.
1.03	21.00	138	0.00	0.00	0.00	39.	1.07	0.00	288	0.00	0.00	0.00	0.
1.03	21.30	139	0.00	0.00	0.00	36.	1.07	.30	289	0.00	0.00	0.00	0.
1.03	22.00	140	0.00	0.00	0.00	34.	1.07	1.00	290	0.00	0.00	0.00	0.
1.03	22.30	141	0.00	0.00	0.00	31.	1.07	1.30	291	0.00	0.00	0.00	0.
1.03	23.00	142	0.00	0.00	0.00	29.	1.07	2.00	292	0.00	0.00	0.00	0.
1.03	23.30	143	0.00	0.00	0.00	27.	1.07	2.30	293	0.00	0.00	0.00	0.
1.04	0.00	144	0.00	0.00	0.00	26.	1.07	3.00	294	0.00	0.00	0.00	0.
1.04	.30	145	0.00	0.00	0.00	24.	1.07	3.30	295	0.00	0.00	0.00	0.
1.04	1.00	146	0.00	0.00	0.00	22.	1.07	4.00	296	0.00	0.00	0.00	0.
1.04	1.30	147	0.00	0.00	0.00	21.	1.07	4.30	297	0.00	0.00	0.00	0.
1.04	2.00	148	0.00	0.00	0.00	19.	1.07	5.00	298	0.00	0.00	0.00	0.
1.04	2.30	149	0.00	0.00	0.00	18.	1.07	5.30	299	0.00	0.00	0.00	0.
1.04	3.00	150	0.00	0.00	0.00	17.	1.07	6.00	300	0.00	0.00	0.00	0.

SUM 24.99 23.33 1.96 140930.
(635.)(593.)(50.)(4237.23)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	12141.	8383.	2878.	1034.	148493.
CMS	344.	237.	81.	29.	4217.
INCHES		16.29	22.31	24.64	24.05
MM		412.67	566.70	626.40	616.93
AC-FT		4157.	5709.	6150.	6154.
THOUS CU M		5120.	7042.	7586.	7591.

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HYDROGRAPH AT STA 8 FOR PLAN 1, RTIO 4

4.	4.	4.	4.	3.	3.	3.	3.	3.	2.
2.	2.	2.	2.	2.	2.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	6.	30.
79.	192.	340.	500.	668.	630.	577.	452.	463.	315.
237.	176.	131.	97.	72.	53.	40.	31.	23.	32.
92.	83.	109.	134.	153.	167.	177.	185.	191.	196.
210.	292.	320.	427.	527.	669.	570.	715.	764.	773.
701.	895.	903.	1220.	1847.	2711.	3693.	4641.	5561.	6403.
8835.	10795.	12063.	12141.	11142.	9645.	8026.	6386.	4911.	3747.
2079.	2292.	1755.	1396.	1129.	931.	775.	642.	577.	536.
502.	469.	437.	460.	381.	355.	332.	309.	289.	269.
251.	234.	219.	204.	190.	179.	166.	155.	144.	135.
126.	117.	109.	102.	95.	89.	83.	77.	72.	67.
63.	59.	55.	51.	48.	44.	41.	39.	36.	34.
31.	29.	27.	26.	24.	22.	21.	19.	19.	17.
16.	15.	14.	13.	12.	11.	10.	10.	9.	8.
8.	7.	7.	6.	6.	6.	5.	5.	5.	4.
4.	4.	3.	3.	3.	3.	3.	2.	2.	2.
2.	2.	2.	2.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	12141.	8393.	2079.	1034.	148033.
CMS	344.	237.	41.	29.	4217.
INCHES		16.25	22.31	24.04	24.05
MM		412.67	566.70	610.49	610.93
AC-FT		4157.	5709.	6150.	6154.
THOUS CU M		5120.	7042.	7586.	7591.

COMBINE HYDROGRAPHS

COMBINE OUTFLOWS FROM SKYLINE AND WANAQUE WITH RUNOFF

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
9	2	0	0	0	0	1	0	0

SUM OF 2 HYDROGRAPHS AT 9 PLAN 1 RTIO 4

4.	4.	6.	16.	17.	25.	34.	43.	52.	61.
71.	81.	91.	100.	110.	120.	130.	140.	153.	160.
170.	180.	190.	200.	209.	219.	229.	239.	255.	289.
347.	461.	628.	799.	917.	949.	907.	839.	762.	684.
617.	566.	530.	507.	492.	483.	479.	481.	487.	502.
532.	570.	625.	700.	777.	852.	924.	999.	1063.	1130.
1230.	1397.	1590.	1822.	2066.	2280.	2457.	2651.	2910.	3255.
3585.	3886.	4203.	4930.	5927.	7406.	9741.	12653.	15249.	17876.
21507.	25757.	28883.	30001.	29391.	29057.	26913.	24986.	23693.	22770.
22588.	22418.	27794.	23438.	24255.	25175.	25455.	26443.	26951.	27440.
27493.	29144.	29336.	28513.	28594.	28554.	28475.	28383.	29291.	28501.
27746.	27493.	27177.	26914.	26437.	26052.	25645.	25210.	24769.	24324.
23898.	23500.	23111.	22726.	22344.	21962.	21581.	21266.	20823.	20440.
20061.	19692.	19303.	18924.	18539.	18159.	17760.	17412.	17025.	16447.
16270.	15893.	15516.	15101.	14754.	14440.	14224.	13971.	13719.	13469.
13217.	12968.	12715.	12464.	12211.	11956.	11727.	11533.	11341.	11152.
10941.	10698.	10450.	10206.	9698.	9657.	9729.	9612.	9451.	9273.
9048.	8901.	8723.	8557.	8394.	8231.	8383.	7953.	7827.	7701.
7576.	7451.	7326.	7201.	7085.	6982.	6893.	6783.	6715.	6513.
6465.	6344.	6240.	6178.	6114.	6051.	5973.	5886.	5782.	5682.
5582.	5482.	5382.	5292.	5191.	5113.	5037.	4961.	4887.	4813.
4738.	4663.	4587.	4543.	4492.	4442.	4392.	4342.	4292.	4242.
4192.	4142.	4092.	4042.	3992.	3942.	3892.	3842.	3792.	3742.
3692.	3642.	3601.	3572.	3546.	3521.	3486.	3440.	3391.	3342.
3301.	3272.	3246.	3221.	3200.	3185.	3172.	3159.	3147.	3134.
3122.	3109.	3093.	3070.	3046.	3021.	2996.	2971.	2946.	2921.
2895.	2871.	2845.	2821.	2800.	2785.	2772.	2759.	2747.	2734.
2722.	2709.	2693.	2670.	2646.	2621.	2596.	2571.	2545.	2521.
2505.	2501.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.
2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	30031.	28196.	25750.	15276.	2511665.
CMS	850.	798.	729.	433.	71692.
INCHES		34.06	124.19	221.46	252.75
MM		865.22	3154.51	5625.01	6419.95
AC-FT		13982.	50976.	90898.	103744.
THOUS CU M		17246.	62878.	112121.	127966.

HYDROGRAPH ROUTING

ROUTING COMBINED FLOWS THROUGH LAKE INEZ

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	300.	-1

STAGE	196.00	197.00	199.00	198.60	199.60	201.10	203.50	207.10	209.00	211.10
FLOW	0.00	670.00	1093.00	2005.00	3925.00	8560.00	13550.00	20620.00	24630.60	30690.00

CAPACITY=	0.	10.	80.	300.	550.	1000.	1630.	1803.
ELEVATION=	182.	185.	190.	196.	200.	205.	210.	211.

CREL	SPWID	COQW	EXPW	ELEVL	COOL	CAREA	EXPL
196.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
211.1	0.0	1.5	0.

STATION 10, PLAN 1, RATIO 4

ITERATIVE SOLUTION DID NOT CONVERGE 89 1 0.000 2.090E+02 4.675E+02 2.090E+02 -7.342E+32

ITERATIVE SOLUTION DID NOT CONVERGE 119 1 0.000 2.090E+02 4.597E+02 2.090E+02 -7.356E+32

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

2.	3.	3.	5.	8.	13.	19.	26.	34.	42.
51.	60.	69.	79.	88.	98.	108.	118.	128.	137.
147.	157.	167.	177.	187.	197.	207.	217.	228.	244.
210.	319.	401.	514.	634.	790.	869.	871.	833.	769.
701.	650.	613.	574.	550.	524.	511.	560.	494.	495.
503.	520.	545.	589.	643.	726.	819.	900.	974.	1045.
1123.	1237.	1365.	1572.	1766.	2028.	2256.	2456.	2670.	2968.
3105.	3645.	4033.	4544.	5324.	6196.	7442.	10161.	12588.	15045.
17637.	20594.	24644.	27652.	28718.	28721.	28002.	26702.	24573.	23869.
23263.	22790.	27696.	22913.	23394.	24076.	25406.	25874.	26361.	26460.
27345.	27740.	28617.	28222.	28389.	28482.	28498.	28463.	28385.	26249.
28656.	27924.	27530.	27221.	26873.	26536.	26122.	25716.	24555.	24551.
24324.	24001.	23642.	23269.	22890.	22510.	22129.	21748.	21367.	20987.
20668.	20249.	19880.	19507.	19124.	18749.	18369.	17990.	17612.	17234.
16950.	16475.	15996.	15569.	15170.	14627.	14532.	14262.	14003.	13749.
13494.	13234.	12983.	12728.	12476.	12222.	11975.	11752.	11543.	11353.
11155.	10938.	10703.	10456.	10226.	10033.	9877.	9746.	9602.	9447.
9275.	9094.	8912.	8736.	8566.	8387.	8224.	8078.	7945.	7817.
7691.	7565.	7440.	7319.	7193.	7080.	6975.	6874.	6785.	6699.
6585.	6457.	6343.	6251.	6176.	6109.	6041.	5960.	5859.	5746.
5645.	5545.	5445.	5345.	5249.	5165.	5087.	5011.	4935.	4861.
4786.	4711.	4640.	4579.	4525.	4474.	4424.	4374.	4324.	4274.
4224.	4174.	4123.	4073.	4023.	3973.	3923.	3873.	3823.	3773.
3723.	3673.	3627.	3591.	3563.	3537.	3510.	3476.	3432.	3384.
3334.	3360.	3270.	3243.	3219.	3199.	3184.	3170.	3159.	3145.
3132.	3126.	3106.	3048.	3066.	3042.	3017.	2992.	2967.	2942.
2917.	2897.	2867.	2842.	2819.	2800.	2786.	2772.	2763.	2747.
2734.	2722.	2704.	2691.	2669.	2645.	2621.	2596.	2571.	2546.
2524.	2510.	2504.	2502.	2531.	2500.	2500.	2500.	2503.	2500.
2500.	2500.	2500.	2500.	2500.	2503.	2500.	2500.	2503.	2500.

STORAGE

300.	300.	300.	300.	301.	301.	302.	302.	303.	304.
305.	306.	306.	307.	306.	309.	310.	311.	312.	315.
314.	315.	316.	317.	317.	318.	319.	320.	321.	323.
325.	330.	337.	340.	366.	369.	373.	373.	371.	368.
364.	361.	357.	354.	351.	349.	344.	347.	346.	346.
347.	349.	351.	355.	366.	365.	370.	374.	373.	382.
386.	391.	399.	434.	420.	431.	443.	448.	457.	468.
480.	491.	501.	514.	535.	528.	626.	718.	823.	936.
1273.	1261.	1460.	1617.	1679.	1679.	1635.	1569.	1493.	1458.
1418.	1394.	1399.	1401.	1429.	1470.	1504.	1578.	1552.	1577.
1661.	1621.	1636.	1649.	1659.	1664.	1665.	1663.	1658.	1650.
1639.	1625.	1611.	1595.	1578.	1559.	1540.	1520.	1493.	1490.
1585.	1569.	1444.	1422.	1399.	1377.	1354.	1332.	1304.	1286.
1264.	1241.	1217.	1193.	1169.	1145.	1120.	1096.	1072.	1047.
1023.	999.	977.	958.	939.	924.	910.	858.	885.	874.
863.	851.	840.	824.	818.	806.	797.	787.	778.	770.
761.	752.	742.	731.	721.	713.	705.	700.	694.	687.
680.	672.	664.	657.	649.	643.	634.	631.	626.	621.
615.	612.	607.	602.	598.	593.	590.	586.	582.	579.
575.	570.	566.	562.	560.	557.	554.	551.	549.	545.
543.	540.	534.	535.	532.	530.	528.	526.	524.	522.
520.	518.	517.	515.	514.	512.	511.	510.	508.	507.
506.	504.	503.	502.	500.	499.	496.	497.	495.	494.
493.	491.	490.	489.	488.	488.	487.	486.	484.	483.
481.	480.	479.	478.	477.	476.	476.	475.	475.	474.
474.	473.	473.	472.	472.	471.	470.	469.	465.	467.
466.	466.	465.	464.	463.	462.	462.	461.	461.	460.
460.	459.	459.	458.	457.	456.	455.	454.	453.	452.
451.	450.	450.	450.	450.	450.	450.	450.	450.	450.
450.	450.	450.	450.	456.	450.	450.	450.	450.	450.

STAGE

196.0	196.0	196.0	196.0	196.0	196.0	196.0	196.0	196.1	196.1
196.1	196.1	196.1	196.1	196.1	196.1	196.2	196.2	196.2	196.2
196.2	196.2	196.2	196.3	196.3	196.3	196.3	196.3	196.3	196.4
196.4	196.5	196.6	196.8	197.0	197.1	197.2	197.2	197.1	197.1
197.0	197.0	196.9	195.9	196.8	196.8	196.8	196.7	196.7	196.7
196.8	196.8	196.8	196.9	197.0	197.0	197.1	197.2	197.2	197.3
197.4	197.5	197.6	197.7	197.9	198.1	198.2	198.4	198.5	198.7
198.9	199.1	199.2	199.4	199.8	200.2	200.8	201.8	203.0	204.3
205.6	207.1	208.7	209.9	210.3	210.3	210.0	209.5	209.0	209.6
208.3	208.1	208.1	208.2	208.4	208.7	209.0	209.2	209.4	209.6
209.8	209.9	210.0	210.1	210.2	210.2	210.2	210.2	210.2	210.1
210.1	210.0	209.8	209.7	209.6	209.4	209.3	209.1	209.0	209.0
208.8	208.7	209.5	208.3	208.2	208.0	207.8	207.6	207.5	207.3
207.1	206.9	206.7	206.5	206.3	206.1	206.0	205.4	205.6	205.4
205.2	205.0	205.7	204.5	204.3	204.2	204.0	203.9	203.7	203.6
203.5	203.3	203.2	203.1	203.0	202.9	202.7	202.6	202.5	202.4
202.3	202.2	202.1	202.0	201.9	201.8	201.7	201.7	201.6	201.5
201.4	201.4	201.3	201.2	201.1	201.0	201.0	200.9	200.8	200.8
200.7	200.7	200.6	200.6	200.5	200.5	200.4	200.4	200.4	200.3
200.3	200.2	200.2	200.1	200.1	200.1	200.0	200.0	200.0	199.9
199.9	199.9	199.8	199.8	199.7	199.7	199.7	199.6	199.6	199.6
199.5	199.5	199.5	199.4	199.4	199.4	199.4	199.4	199.3	199.3
199.3	199.3	199.2	199.2	199.2	199.2	199.2	199.1	199.1	199.1
199.1	199.1	199.0	199.0	199.0	199.0	199.0	199.0	198.9	198.9
198.9	198.9	198.9	198.8	198.8	198.9	198.8	198.8	198.8	198.8
198.8	198.8	198.8	198.8	198.7	198.7	198.7	198.7	198.7	198.7
198.7	198.6	198.6	198.6	198.6	198.6	198.6	198.6	198.6	198.6
198.6	198.5	198.5	198.5	198.5	198.5	198.5	198.5	198.4	198.4
198.4	198.4	198.4	198.4	198.4	198.4	198.4	198.4	198.4	198.4
198.4	198.4	198.4	198.4	198.4	198.4	198.4	198.4	198.4	198.4

PEAK OUTFLOW IS 28721. AT TIME 43.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	28721.	28148.	25609.	15270.	2506285.
CMS	813.	797.	725.	432.	70470.
INCHES		34.00	123.75	221.37	252.32
MM		863.72	3143.37	5622.85	6408.90
AC-FT		13957.	50796.	90863.	103565.
THOUS CU M		17216.	62656.	112078.	127746.

HYDROGRAPH ROUTING

CHANNEL ROUTING -MODIFIED PULS- STATION 10 TO 11

	ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
	11	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	1	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.1000	.0450	.1000	183.0	220.0	400.	.00100

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 220.00 900.00 200.00 950.00 190.00 975.00 183.00 1025.00 183.00

1050.00 193.00 1100.00 200.00 1250.00 220.00

STORAGE	0.00	1.02	2.29	3.80	5.57	7.60	10.13	12.93	16.00	19.63
	24.61	31.43	40.07	50.54	62.83	76.46	92.91	110.70	130.31	151.74
OUTFLOW	0.00	166.79	563.66	1170.25	2071.51	3320.73	4836.20	6623.50	8688.90	10967.38
	13569.50	16724.25	20407.85	24938.91	30153.95	36205.67	43163.27	51092.94	60059.37	70121.65
STAGE	183.00	184.95	185.89	188.84	190.79	192.74	194.68	196.63	198.58	200.53
	202.47	204.42	206.37	208.32	210.26	212.21	214.16	216.11	218.05	220.00
FLOW	0.00	166.79	560.66	1170.25	2071.51	3320.73	4836.20	6623.50	8688.90	10967.38
	13569.50	16724.25	20407.85	24938.91	30153.95	36205.67	43163.27	51092.94	60059.37	70121.65

STATION 11, PLAN 1, RTIO 4

OUTFLOW

3.	7.	4.	5.	8.	12.	18.	25.	32.	41.
49.	59.	68.	77.	87.	97.	107.	116.	126.	136.
146.	156.	166.	177.	186.	195.	206.	216.	227.	242.
265.	315.	343.	504.	631.	779.	909.	872.	835.	772.
706.	652.	616.	580.	552.	529.	512.	561.	695.	695.
502.	518.	545.	586.	646.	720.	814.	895.	973.	1040.
1117.	1226.	1377.	1562.	1775.	2016.	2249.	2447.	2667.	2954.
3292.	3632.	4017.	4521.	5293.	6352.	7873.	10016.	12460.	14367.
17495.	20379.	23030.	27452.	20767.	20602.	20107.	26752.	24740.	23790.
23327.	22733.	22751.	22147.	23397.	24064.	25325.	25089.	26303.	26458.
27297.	27737.	27991.	28222.	28372.	28486.	28494.	28471.	28307.	28262.
28070.	27940.	27552.	27240.	26834.	26527.	26144.	25746.	24695.	24472.
24410.	23966.	23707.	23256.	22946.	22509.	22168.	21755.	21463.	21033.
20634.	20267.	19907.	19523.	19154.	18768.	18393.	18010.	17635.	17254.
16478.	16404.	15626.	15585.	15195.	14839.	14549.	14273.	14014.	13760.
13509.	13744.	12973.	12730.	12488.	12233.	11790.	11701.	11557.	11362.
11165.	10949.	10711.	10469.	10233.	10040.	9882.	9746.	9607.	9453.
9281.	9161.	9418.	8743.	8574.	8345.	8229.	8084.	7949.	7822.
7695.	7570.	7444.	7320.	7197.	7084.	6979.	6870.	6788.	6703.
6548.	6462.	6347.	6254.	6179.	6112.	6043.	5964.	5862.	5750.
5649.	5549.	5449.	5349.	5253.	5168.	5093.	5014.	4934.	4864.
4789.	4714.	4643.	4581.	4527.	4476.	4426.	4376.	4325.	4276.
4228.	4179.	4125.	4075.	4025.	3975.	3923.	3875.	3825.	3775.
3725.	3675.	3629.	3593.	3564.	3539.	3512.	3477.	3433.	3385.
3339.	3301.	3271.	3244.	3226.	3200.	3165.	3172.	3150.	3146.
3133.	3120.	3107.	3094.	3067.	3043.	3019.	2993.	2969.	2943.
2918.	2893.	2868.	2843.	2820.	2801.	2786.	2773.	2760.	2740.
2735.	2722.	2709.	2691.	2670.	2646.	2622.	2597.	2572.	2547.
2525.	2511.	2504.	2502.	2501.	2503.	2560.	2560.	2563.	2506.
2506.	2500.	2500.	2500.	2506.	2500.	2503.	2500.	2563.	2500.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	2.	2.	2.	3.	3.	3.	3.	3.
3.	3.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	3.	3.	3.	3.	3.
4.	4.	4.	5.	5.	5.	6.	6.	7.	7.
8.	8.	9.	10.	11.	13.	15.	18.	23.	28.
33.	40.	48.	56.	60.	59.	58.	55.	53.	48.
47.	49.	45.	46.	47.	48.	51.	53.	54.	55.
56.	57.	58.	58.	59.	59.	59.	59.	59.	58.
58.	57.	57.	56.	55.	54.	53.	52.	53.	49.
49.	48.	48.	47.	46.	45.	44.	43.	42.	41.
40.	40.	39.	38.	37.	36.	35.	34.	34.	33.
32.	31.	30.	29.	28.	27.	27.	26.	26.	25.
24.	24.	24.	23.	23.	22.	22.	21.	21.	20.
20.	20.	19.	19.	18.	18.	18.	18.	19.	17.
17.	17.	16.	16.	16.	16.	15.	15.	15.	15.
15.	14.	14.	14.	14.	14.	13.	13.	13.	13.
13.	13.	12.	12.	12.	12.	12.	12.	12.	12.
11.	11.	11.	11.	11.	11.	11.	10.	10.	10.
10.	10.	10.	10.	10.	10.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	8.	8.
8.	8.	8.	8.	8.	8.	8.	8.	8.	8.
8.	8.	8.	8.	8.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	7.	7.	7.
7.	7.	7.	7.	7.	7.	7.	6.	6.	6.
6.	6.	6.	6.	6.	6.	6.	6.	5.	6.
6.	6.	6.	6.	6.	6.	6.	6.	6.	6.

STAGE

183.0	183.0	183.0	183.1	183.1	183.1	183.2	183.3	183.4	183.5
183.6	183.7	183.8	183.9	184.0	184.1	184.2	184.4	184.5	184.6
184.7	184.8	184.9	185.0	185.0	185.1	185.1	185.2	185.2	185.3
185.4	185.7	186.1	186.4	187.1	187.6	187.9	187.9	187.8	187.6
187.4	187.2	187.1	187.0	186.9	186.7	186.7	186.6	186.6	186.6
188.6	188.7	188.8	187.0	187.1	187.4	187.7	188.0	188.2	188.4
188.7	189.0	189.3	189.7	190.1	190.7	191.1	191.6	191.7	192.2
192.7	193.1	193.6	194.3	195.2	196.3	197.9	199.7	201.6	203.3
204.0	206.3	207.8	209.3	209.7	209.7	209.5	209.0	208.2	207.8
207.6	207.4	207.4	207.4	207.6	207.9	208.5	208.7	208.8	209.0
209.2	209.4	209.5	209.5	209.6	209.6	209.6	209.6	209.6	209.6
209.5	209.4	209.3	209.2	209.0	208.9	208.8	208.6	208.2	208.1
208.1	207.9	207.8	207.6	207.4	207.3	207.1	206.9	206.8	206.6
206.4	206.3	206.1	205.9	205.7	205.5	205.3	205.1	204.9	204.7
204.5	204.3	204.0	203.7	203.5	203.3	203.1	202.9	202.8	202.6
202.4	202.2	202.0	201.9	201.7	201.5	201.3	201.1	201.0	200.8
200.7	200.5	200.3	200.1	199.9	199.7	199.6	199.5	199.4	199.2
199.1	198.9	198.8	198.6	198.5	198.3	198.1	198.0	197.9	197.8
197.6	197.5	197.4	197.3	197.2	197.1	197.0	196.9	196.9	196.7
196.6	196.5	196.3	196.2	196.1	196.1	196.0	195.9	195.8	195.7
195.6	195.5	195.4	195.2	195.1	195.0	195.0	194.9	194.8	194.7
194.8	194.7	194.6	194.4	194.3	194.2	194.2	194.1	194.0	194.0
193.9	193.8	193.8	193.7	193.6	193.6	193.5	193.4	193.4	193.3
193.3	193.2	193.1	193.1	193.0	193.0	193.0	192.9	192.9	192.8
192.8	192.7	192.7	192.6	192.6	192.5	192.5	192.5	192.5	192.5
192.4	192.4	192.4	192.4	192.3	192.3	192.3	192.2	192.2	192.1
192.1	192.1	192.0	192.0	192.0	191.9	191.9	191.9	191.9	191.8
191.8	191.8	191.8	191.8	191.7	191.7	191.6	191.6	191.6	191.5
191.5	191.5	191.5	191.5	191.5	191.5	191.5	191.5	191.5	191.5
191.5	191.5	191.5	191.5	191.5	191.5	191.5	191.5	191.5	191.5

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	28923.	28146.	25609.	15270.	2506133.
CMS	819.	797.	725.	432.	70966.
INCHES		34.00	123.75	221.37	252.30
MM		863.69	3143.20	5622.86	6408.51
AC-FT		13957.	50794.	91186.	103599.
THOUS CU M		17216.	62654.	112478.	127786.

MAXIMUM STORAGE = 60.

MAXIMUM STAGE IS 209.7

D-39

HYDROGRAPH ROUTING

CHANNEL ROUTING -MODIFIED PULS- STATION 11 TO 12

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
12	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.1000	.0450	.1000	181.0	220.0	2300.	.00100

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 223.00 99.00 200.00 550.00 196.00 979.00 181.00 625.00 181.00
650.00 193.00 880.00 200.00 2550.00 220.00

STORAGE	0.00	5.04	13.31	21.82	31.56	45.09	72.01	113.44	169.33	239.60
	320.62	432.21	554.41	704.64	870.09	1057.16	1263.46	1489.77	1736.11	2002.47
OUTFLOW	0.00	179.90	595.26	1220.61	2082.01	3309.21	5048.91	7439.87	10532.19	14539.68
	19595.98	26133.92	34157.34	43776.42	55110.64	68304.32	83462.63	100711.17	120166.21	141940.92
STAGE	181.00	183.05	185.11	187.16	189.21	191.26	193.32	195.37	197.42	199.47
	201.53	203.58	205.63	207.68	209.74	211.79	213.84	215.89	217.95	220.00
FLOW	0.00	179.90	596.26	1220.61	2082.01	3309.21	5048.91	7439.87	10532.19	14539.68
	19595.98	26133.92	34157.34	43776.42	55110.64	68304.32	83462.63	100711.17	120166.21	141940.92

STATION 12, PLAN 1, RTIO 4

OUTFLOW

2.	2.	3.	4.	6.	9.	14.	19.	25.	34.
42.	51.	60.	70.	79.	89.	99.	100.	110.	120.
130.	148.	159.	169.	172.	192.	202.	212.	222.	236.
257.	294.	359.	456.	577.	730.	844.	876.	849.	794.
727.	668.	626.	593.	564.	537.	519.	505.	497.	494.
849.	911.	934.	869.	919.	693.	703.	870.	946.	1019.
1092.	1109.	1331.	1504.	1714.	1940.	2107.	2397.	2665.	2873.
3149.	3513.	3069.	4326.	4990.	5093.	7212.	9067.	11402.	13905.
16444.	19174.	22446.	20024.	20391.	20770.	20346.	27365.	25549.	24121.
23444.	22974.	22714.	22569.	23160.	23766.	24772.	25767.	26141.	26630.
27137.	27940.	27964.	28136.	28319.	28444.	28496.	28486.	28422.	28311.
28146.	27979.	27665.	27350.	27027.	26660.	26291.	25958.	25116.	24490.
24434.	24158.	23798.	23443.	23056.	22685.	22297.	21922.	21537.	21160.
20777.	20410.	20045.	19675.	19305.	18920.	18547.	18168.	17783.	17411.
17033.	16693.	16223.	15760.	15354.	14985.	14607.	14389.	14125.	13873.
13415.	13197.	13049.	12847.	12596.	12342.	12092.	11857.	11643.	11444.
11240.	11041.	10812.	10572.	10335.	10123.	9950.	9764.	9641.	9520.
9356.	9179.	8978.	8819.	8647.	8472.	8300.	8146.	8007.	7877.
7750.	7624.	7499.	7373.	7249.	7132.	7023.	6920.	6826.	6739.
6639.	6517.	6395.	6293.	6210.	6140.	6072.	5998.	5905.	5798.
5542.	5493.	5491.	5391.	5293.	5204.	5123.	5046.	4966.	4892.
4817.	4742.	4669.	4604.	4547.	4493.	4449.	4394.	4344.	4294.
4244.	4194.	4144.	4094.	4044.	3994.	3944.	3894.	3844.	3794.
3744.	3696.	3644.	3606.	3574.	3548.	3521.	3491.	3453.	3404.
3350.	3315.	3270.	3251.	3226.	3205.	3180.	3175.	3162.	3149.
3136.	3124.	3110.	3094.	3073.	3049.	3025.	3000.	2975.	2950.
2925.	2906.	2875.	2856.	2820.	2805.	2790.	2777.	2764.	2751.
2739.	2720.	2713.	2696.	2676.	2653.	2629.	2604.	2579.	2554.
2531.	2514.	2506.	2502.	2501.	2500.	2500.	2500.	2500.	2500.
2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.	2500.

STOR

0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
1.	2.	2.	2.	3.	3.	3.	4.	4.	4.
3.	5.	5.	6.	6.	6.	6.	7.	7.	7.
7.	9.	9.	11.	13.	19.	17.	17.	17.	16.
15.	14.	14.	13.	13.	12.	12.	12.	12.	12.
12.	12.	12.	13.	14.	15.	16.	17.	19.	19.
20.	21.	23.	25.	27.	30.	33.	35.	37.	40.
44.	48.	54.	61.	71.	87.	113.	143.	185.	229.
272.	319.	372.	436.	460.	474.	467.	491.	423.	406.
309.	391.	377.	370.	384.	396.	436.	425.	432.	443.
440.	473.	460.	464.	467.	469.	469.	469.	460.	466.
464.	460.	456.	451.	446.	441.	435.	428.	416.	406.
405.	400.	394.	389.	382.	376.	370.	364.	359.	351.
345.	339.	333.	327.	321.	315.	309.	302.	295.	289.
282.	274.	269.	261.	254.	247.	242.	237.	232.	220.
223.	219.	214.	210.	206.	201.	197.	193.	188.	185.
182.	179.	174.	170.	166.	162.	158.	156.	154.	151.
148.	145.	142.	139.	136.	132.	129.	127.	124.	122.
120.	117.	115.	113.	111.	109.	107.	105.	103.	102.
100.	98.	96.	94.	92.	91.	90.	89.	87.	85.
83.	82.	80.	79.	76.	75.	73.	72.	71.	70.
68.	67.	66.	65.	64.	63.	63.	62.	61.	60.
60.	59.	58.	57.	56.	56.	55.	54.	53.	53.
52.	51.	50.	50.	49.	49.	48.	48.	47.	47.
46.	45.	45.	44.	44.	44.	44.	44.	43.	43.
43.	43.	43.	43.	42.	42.	42.	42.	41.	41.
41.	41.	40.	40.	40.	40.	39.	39.	39.	39.
39.	38.	38.	38.	38.	38.	38.	37.	37.	37.
38.	38.	38.	38.	38.	38.	38.	36.	36.	36.
36.	36.	36.	36.	36.	36.	36.	36.	36.	36.

STAGE

181.0	181.0	181.0	181.0	181.1	181.1	181.2	181.2	181.3	181.4
181.5	181.6	181.7	181.8	181.9	182.0	182.1	182.2	182.3	182.5
182.6	182.7	182.8	182.9	183.0	183.1	183.2	183.2	183.3	183.3
183.4	183.6	183.9	184.4	185.0	185.5	185.9	186.0	185.9	185.7
185.5	185.3	185.2	185.1	184.9	184.8	184.7	184.7	184.6	184.6
184.6	184.7	184.8	185.0	185.2	185.4	185.7	186.0	186.2	186.5
186.7	187.0	187.4	187.8	188.3	188.9	189.4	189.7	190.1	190.5
191.1	191.5	191.9	192.5	193.2	194.0	195.2	196.5	197.9	199.1
200.2	201.4	202.4	203.5	204.2	204.3	204.1	203.9	203.4	202.9
202.8	202.6	202.5	202.5	202.6	202.8	203.2	203.4	203.6	203.7
203.8	203.9	204.0	204.1	204.1	204.2	204.2	204.2	204.2	204.1
204.1	204.0	204.0	203.9	203.8	203.7	203.6	203.5	203.3	203.1
203.0	202.9	202.8	202.7	202.6	202.5	202.4	202.3	202.1	202.0
201.9	201.8	201.7	201.6	201.4	201.3	201.1	200.9	200.8	200.6
200.5	200.3	200.2	200.0	199.8	199.7	199.5	199.4	199.3	199.1
199.0	198.9	198.7	198.6	198.5	198.3	198.2	198.1	198.0	197.9
197.8	197.7	197.6	197.4	197.3	197.2	197.0	196.9	196.9	196.8
196.6	196.5	196.4	196.3	196.2	196.1	196.0	195.9	195.8	195.7
195.6	195.5	195.4	195.3	195.2	195.1	195.0	194.9	194.9	194.8
194.7	194.6	194.5	194.4	194.3	194.3	194.2	194.1	194.1	194.0
193.9	193.9	193.7	193.6	193.5	193.5	193.4	193.3	193.2	193.1
193.0	193.0	192.9	192.8	192.7	192.7	192.6	192.5	192.5	192.4
192.4	192.3	192.2	192.2	192.1	192.1	192.0	192.0	191.9	191.8
191.8	191.7	191.7	191.6	191.6	191.5	191.5	191.5	191.4	191.4
191.3	191.3	191.2	191.2	191.1	191.1	191.1	191.0	191.0	191.0
191.0	191.0	190.9	190.9	190.9	190.8	190.8	190.7	190.7	190.7
190.6	190.6	190.5	190.5	190.5	190.4	190.4	190.4	190.3	190.3
190.3	190.3	190.3	190.2	190.2	190.2	190.1	190.1	190.0	190.0
190.0	189.9	189.9	189.9	189.9	189.9	189.9	189.9	189.9	189.9
189.9	189.9	189.9	189.9	189.9	189.9	189.9	189.9	189.9	189.9

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	20770.	20143.	15596.	15270.	2905259.
CMS	588.	570.	449.	432.	76941.
INCHES		34.60	123.69	221.37	292.22
MM		883.50	3141.67	5622.80	[illegible]
AC-FT		13955.	50700.	90602.	103523.
THOUS CU M		17213.	62622.	112077.	127694.

MAXIMUM STORAGE = 474.

MAXIMUM STAGE IS 204.3

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1 .10	RATIO 2 .25	RATIO 3 .50	RATIO 4 1.00
				RATIOS APPLIED TO FLOWS			
HYDROGRAPH AT	1	2.90	1	1060.	2651.	5302.	10603.
	(	7.51)	(	30.02)(	75.06)(	150.12)(	300.24)(
ROUTED TO	2	2.90	1	1059.	2642.	5285.	10582.
	(	7.51)	(	29.98)(	74.80)(	149.66)(	299.64)(
ROUTED TO	3	2.90	1	1039.	2599.	5192.	10384.
	(	7.51)	(	29.43)(	73.59)(	147.01)(	294.05)(
ROUTED TO	4	2.90	1	781.	2062.	4294.	8854.
	(	7.51)	(	22.12)(	58.39)(	121.59)(	250.73)(
HYDROGRAPH AT	5	0.00	1	2830.	7075.	14150.	28300.
	(	0.00)	(	80.14)(	200.34)(	400.68)(	801.37)(
2 COMBINED	6	2.90	1	2832.	7078.	14154.	28307.
	(	7.51)	(	80.19)(	200.43)(	400.81)(	801.55)(
ROUTED TO	7	2.90	1	2825.	7062.	14121.	28213.
	(	7.51)	(	79.99)(	199.96)(	399.86)(	798.91)(
HYDROGRAPH AT	8	4.80	1	1214.	3035.	6070.	12141.
	(	12.43)	(	34.38)(	85.95)(	171.89)(	343.79)(
2 COMBINED	9	7.70	1	2933.	7422.	15001.	30001.
	(	19.94)	(	83.06)(	210.16)(	424.77)(	849.52)(
ROUTED TO	10	7.70	1	2881.	7276.	14507.	28721.
	(	19.94)	(	81.58)(	206.03)(	410.79)(	813.29)(
ROUTED TO	11	7.70	1	2882.	7274.	14486.	28767.
	(	19.94)	(	81.62)(	205.97)(	410.21)(	814.60)(
ROUTED TO	12	7.70	1	2886.	7266.	14505.	28770.
	(	19.94)	(	81.72)(	205.75)(	410.73)(	814.67)(

PLAN 1 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.10	1059.	261.0	40.50
.25	2642.	264.2	40.50
.50	5205.	266.7	40.50
1.00	10502.	270.0	40.50

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.10	1039.	255.3	41.00
.25	2599.	257.3	41.00
.50	5176.	259.2	41.00
1.00	10304.	261.9	41.00

PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.10	701.	220.5	41.50
.25	2662.	221.9	41.50
.50	4294.	223.3	41.50
1.00	8034.	225.1	41.50

PLAN 1 STATION 7

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.10	2025.	210.1	52.50
.25	7662.	214.7	52.50
.50	14121.	219.7	52.50
1.00	20213.	226.2	52.50

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	190.60	190.00	211.10
STORAGE	306.	300.	1060.
OUTFLOW	0.	0.	20090.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	190.64	0.00	469.	2081.	0.00	43.00	0.00
.25	200.56	0.00	631.	7276.	0.00	42.50	0.00
.50	203.99	0.00	909.	14567.	0.00	42.50	0.00
1.00	210.32	0.00	1679.	20721.	0.00	43.00	0.00

PLAN 1 STATION 11

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.10	2982.	192.1	43.00
.25	7274.	197.2	42.50
.50	14406.	203.0	42.50
1.00	20767.	209.7	42.50

PLAN 1 STATION 12

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.10	2986.	190.6	43.00
.25	7266.	195.2	43.00
.50	14505.	199.5	43.00
1.00	20770.	204.3	43.00

Form 11-SC-10-12

DAMS IN NEW JERSEY—REFERENCE DATA

Wanaque River No. 23-89

Name of Owner ______ Address ______

Name of Dam Lake Inez County Passaic Location 23-31-9-7-5

CONSTRUCTION: Date ______ By whom ______

Stream Wanaque River Tributary to Pompton River

DRAINAGE BASIN: Area ______ sq. mi. Description ______

Description of valley below dam Residential (Pompton Lakes)

DAMAGE FROM FAILURE: Probable ______

Previous (date) ______

Purpose ______ Type Concrete Wall

Foundation ______

Length ______ ft. Max. height ______ ft. Max. width of top ______ ft.

Upstream slope ______ Downstream slope ______ Volume ______ Cu. yds.

SPILLWAY: Type ______ Length ______ ft.

Depth below top of ______ ft. Capacity ______ c. f. s. per sq. mi.

RESERVOIR: Capacity ______ mill. gals. Area ______ acres. Length ______ ft.

Outlets ______

Remarks ______

Sources of data U.S.G.S. Sheets, Continuous Profile Date Sept. 1[illegible], 1965

PFB

Report on Dam Inspection

Dam No. 23-89
Lake Inez Dam
Wanaque River
Willard Kluge, Artistic Weaving Co., Owner
Borough of Pompton Lakes, Passaic Co.
Location 23·31·8·7·5

At the request of Councilman Dwinell Travers, Borough of Pompton Lakes, an inspection of the subject dam was made in his company on May 24, 1960. Also present at the inspection were Mr. Frank Magill of Pompton Lakes, and Steve Dola and James Riley of this office.

The Lake Inez dam which is located upstream of Wanaque Avenue and the main part of the Borough of Pompton Lakes, once supplied water and power for an old adjacent mill which is now being operated as a weaving plant. Basically the dam is of heavy masonry construction with a concrete apron downstream. The main spillway has a length of 205.9 feet with a free board of 2.6 feet above the spillway crest. The old raceway through the powerhouse of the old mill has been walled off. The only other opening is a small sluiceway with timber gates in a span of 9.4 feet.

In the writer's opinion, the over-all structural condition of the dam, with the exception of the timber sluice gate and portions of the easterly end of the dam, is sound.

The timber sluice gate, which is located at the westerly end of the dam, is in very poor condition and failure is only a matter of time. Failure of the gate would only de-water the lake and complete failure of the dam probably would be unlikely. However, failure of the gate in time of a major flood may aggravate flooding conditions downstream.

Portions of the top spillway have shifted out of position in the area directly adjacent to an old forebay at the easterly end of the dam. Indications are, however, that this condition has existed for quite some time. Several points of leakage through the masonry spillway section were also noted in this same area. Grouting with the lake level lowered would probably eliminate these conditions.

A water and sand boil was noted within the old forebay downstream of its upstream wall. Indications are that this condition has also existed for quite some time. Combination of grouting and the placement of a clay blanket directly upstream would probably eliminate this conditions. Filling in of the forebay would also help to eliminate this conditions.

It is recommended that the attached letter be sent to the owner of the Lake Inez dam.

Michael J. Galley
Supervising Engineer Hydraulic

Trenton, New Jersey
June 2, 1960

Note: Stream survey sheet showing details of dam is attached.

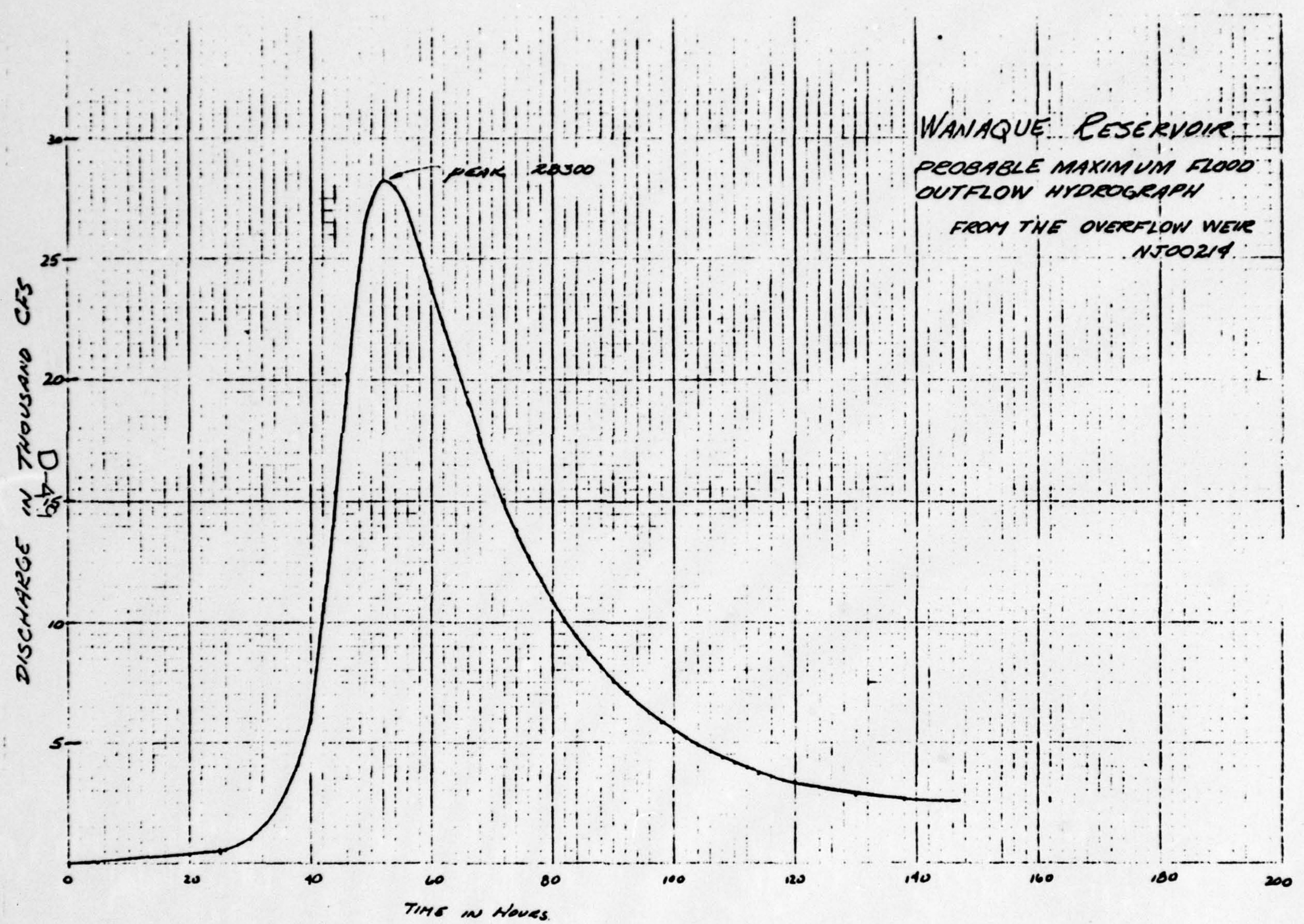
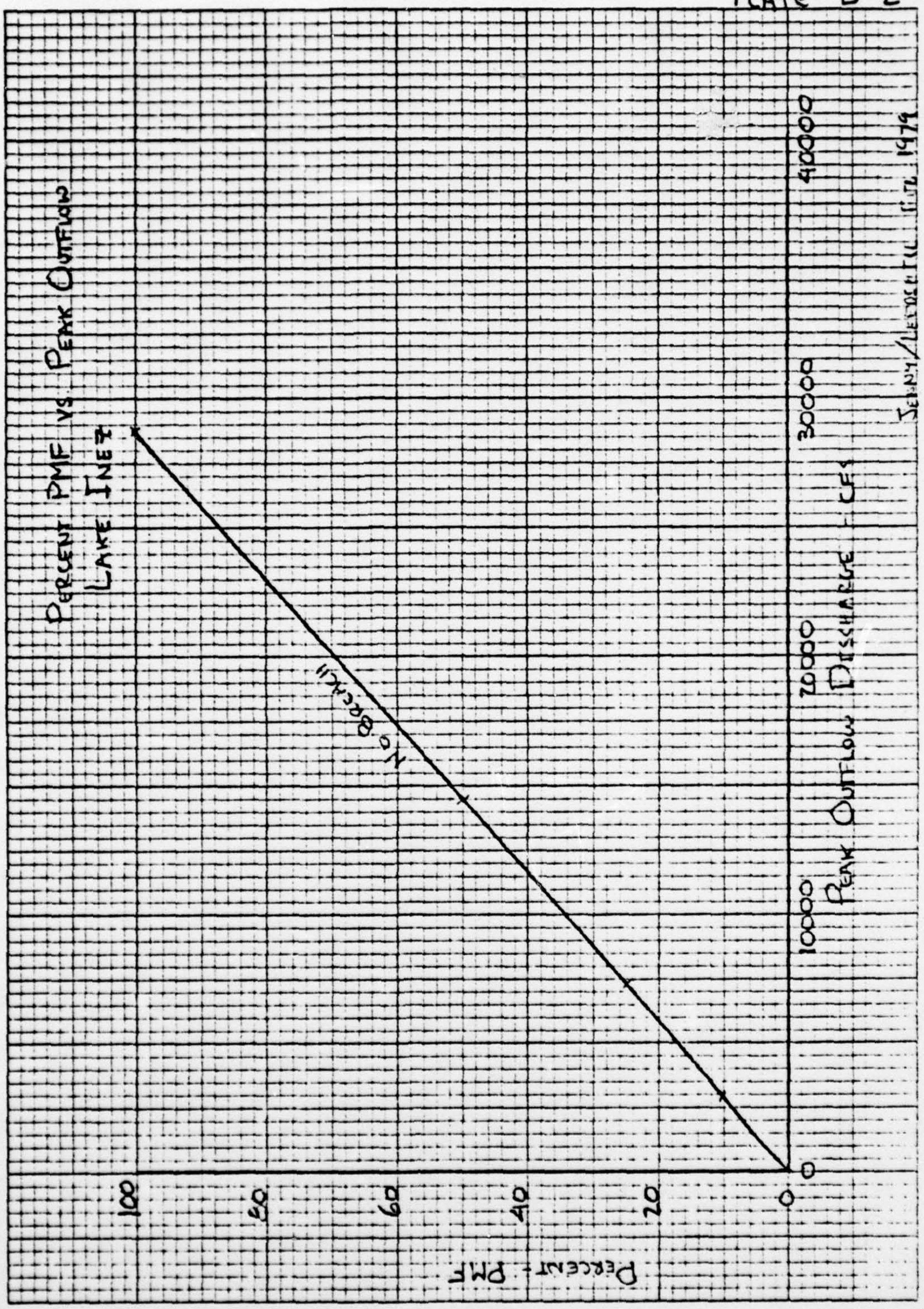

WANAQUE RESERVOIR
PROBABLE MAXIMUM FLOOD
OUTFLOW HYDROGRAPH
FROM THE OVERFLOW WEIR
NJ00214
PEAK 28300
DISCHARGE IN THOUSAND CFS
TIME IN HOURS
0
5
10
15
20
25
30
0
20
40
60
80
100
120
140
160
180
200

PLATE D-2


PERCENT PMF VS PEAK OUTFLOW
LAKE INEZ
NO BREACH
PEAK OUTFLOW DISCHARGE - CFS
0
10000
20000
30000
40000
PERCENT - PMF
0
20
40
60
80
100

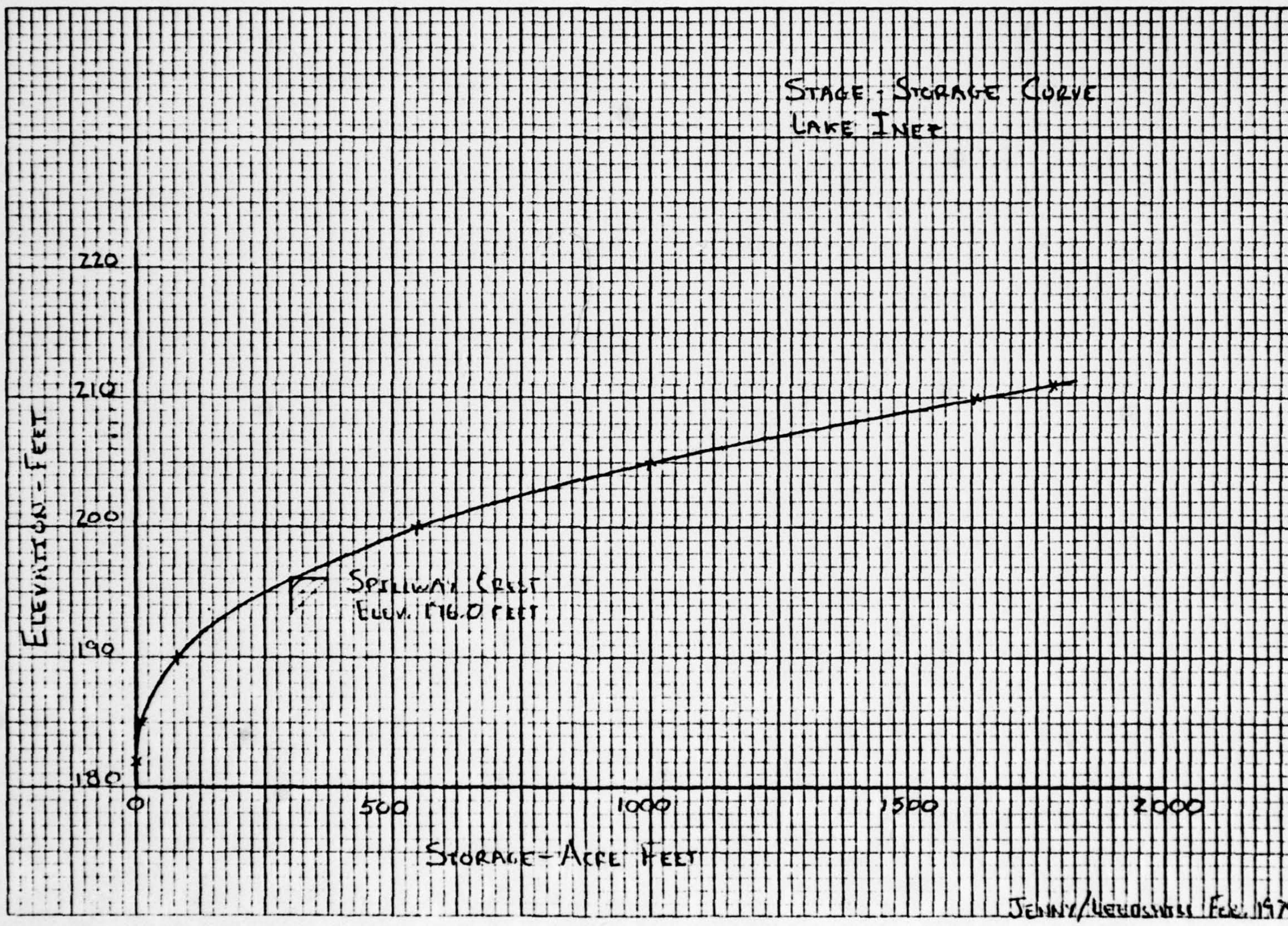

STAGE - STORAGE CURVE
LAKE INEZ
SPILLWAY CREST
ELEV. 196.0 FEET
ELEVATION - FEET
220
210
200
190
180
0
500
1000
1500
2000
STORAGE - ACRE FEET

PLATE D-3

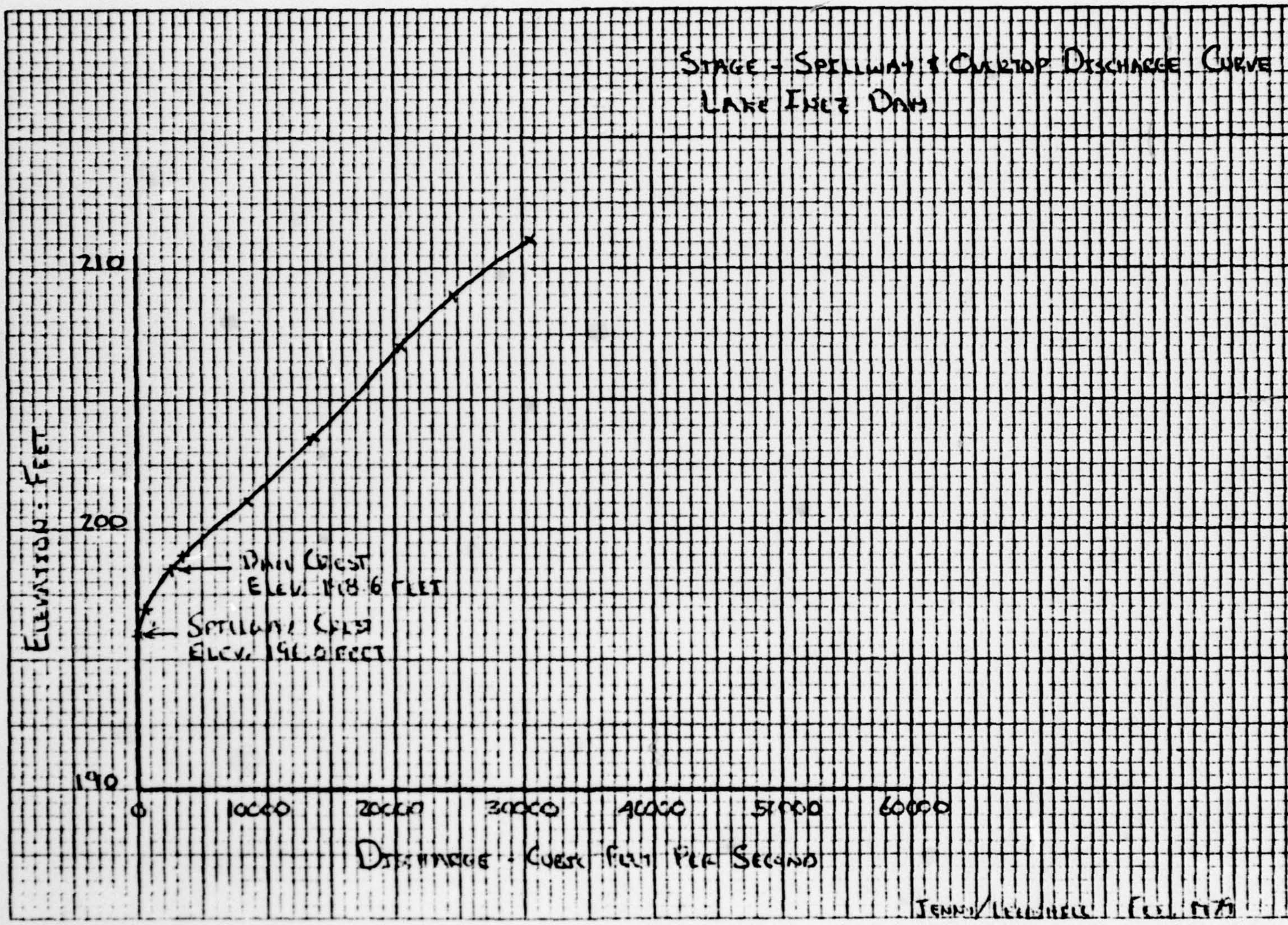
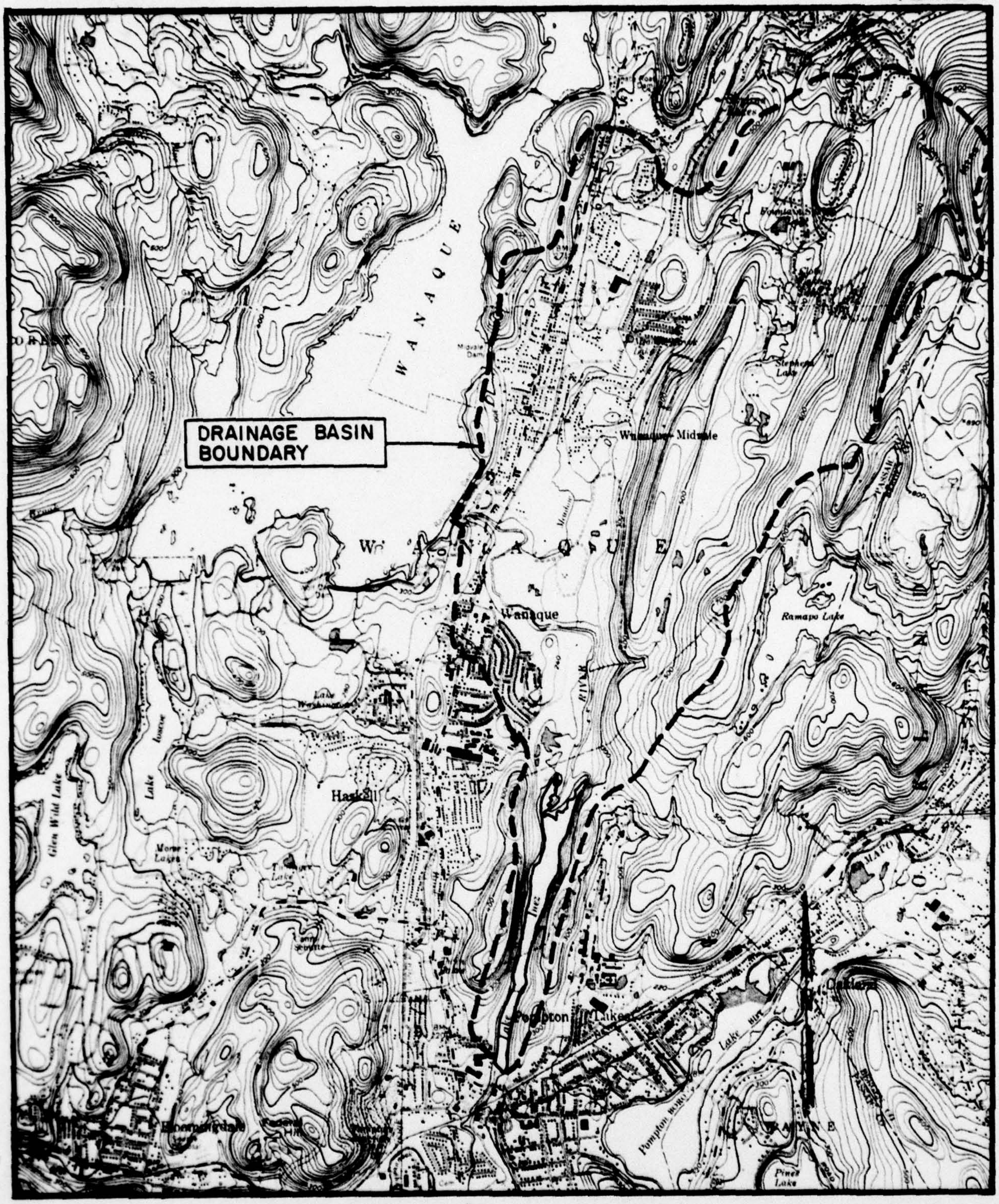

STAGE - SPILLWAY & OVERTOP DISCHARGE CURVE
LAKE INEZ DAM
210
200
190
DAM CREST
ELEV. 198.6 FEET
SPILLWAY CREST
ELEV. 196.0 FEET
ELEVATION : FEET
0
10000
20000
30000
40000
50000
60000
DISCHARGE : CUBIC FEET PER SECOND

PLATE D-4

PLATE D-1



1000 0 1000 2000 3000 4000 5000 6000

SCALE IN FEET

AREA LOCATION

LAKE INEZ DAM

JENNY-LEEDSHILL FEBRUARY 1979

CLEARPRINT PAPER CO. C35 10 X 10 DIVISIONS PER INCH 70 X 100 DIVISIONS CLEARPRINT CHARTS PRINTED IN U.S.A. ON CLEARPRINT TECHNICAL PAPER NO. 1015

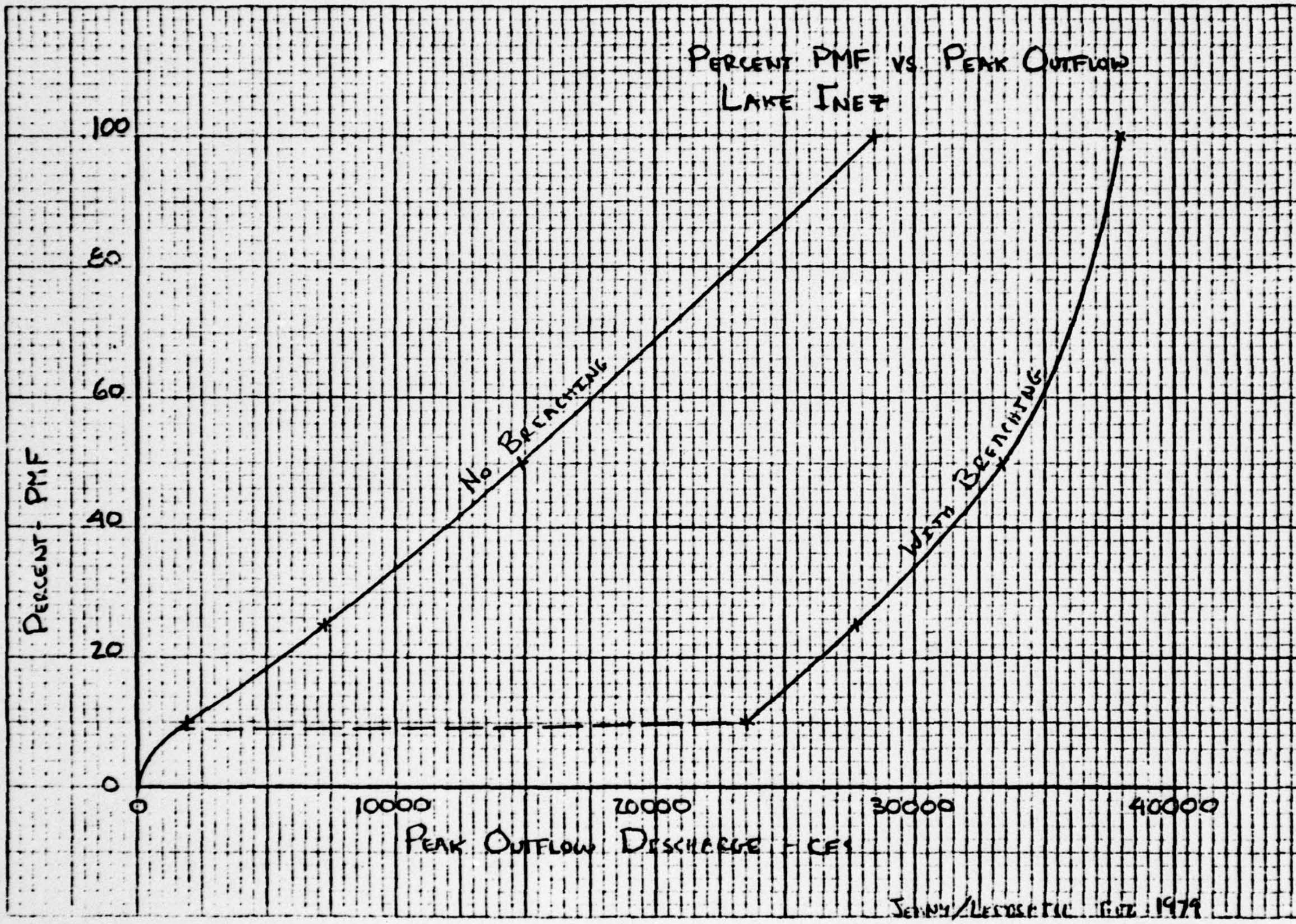


PLATE D-2

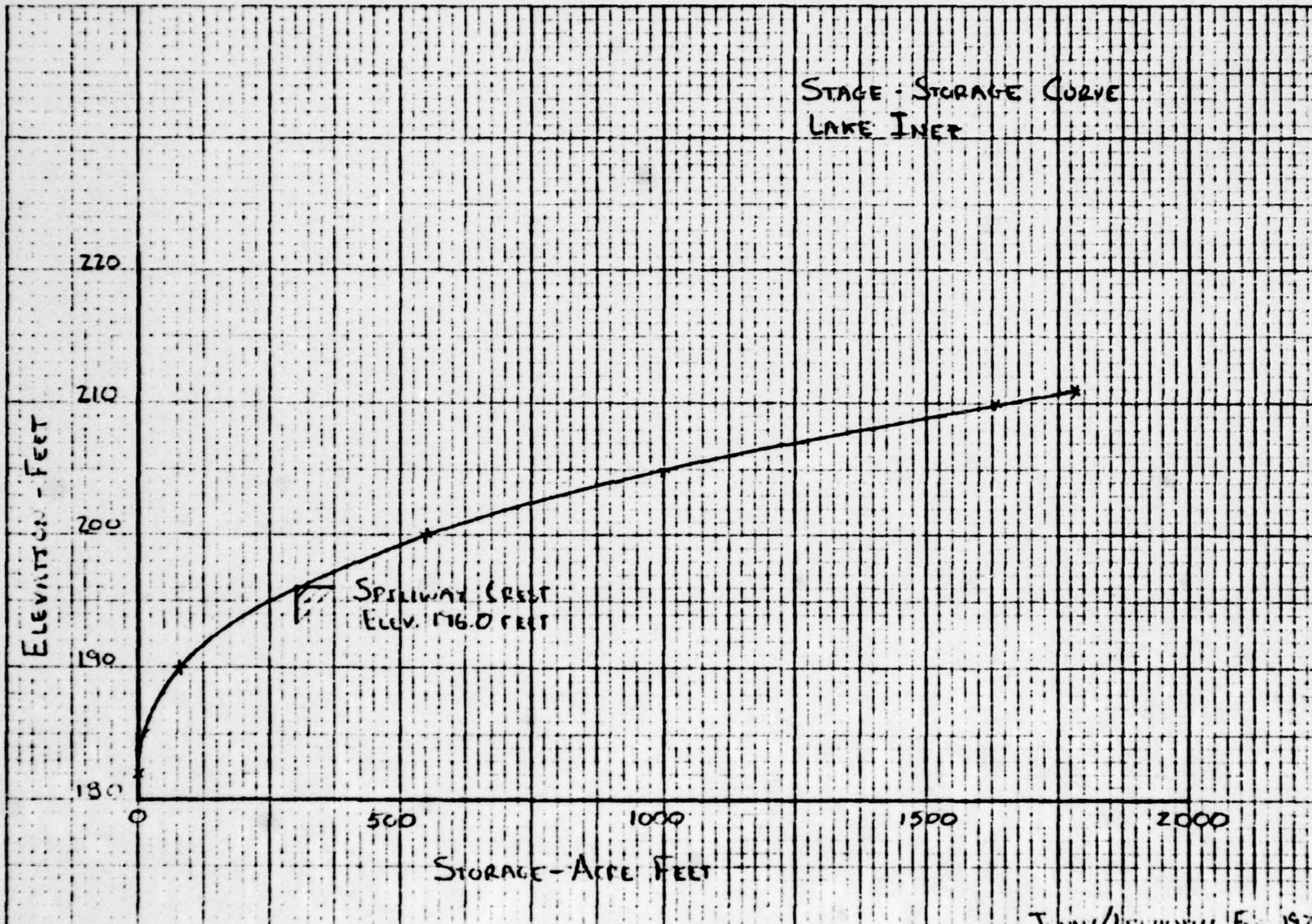


PLATE D-3

Feb. 1977

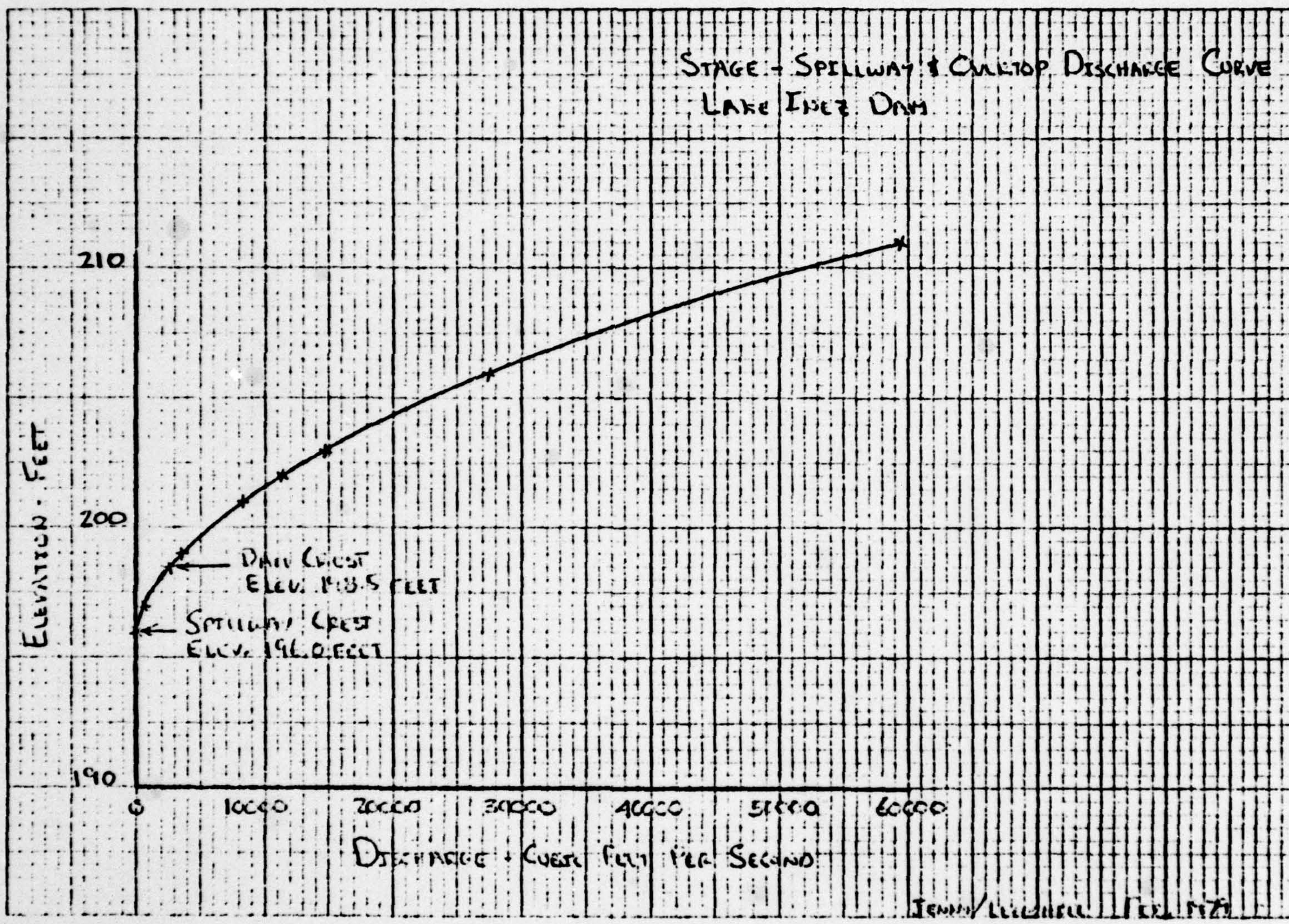

Stage - Spillway & Overtop Discharge Curve
Lake Inez Dam
Elevation - Feet
210
200
190
Dam Crest
Elev. 198.5 Feet
Spillway Crest
Elev. 196.0 Feet
0
10000
20000
30000
40000
50000
60000
Discharge - Cubic Feet Per Second

PLATE D-4